FEBRUARY 25, 1952

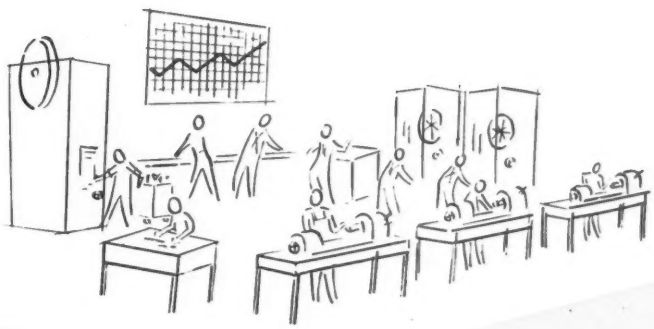
STEEL

THE WEEKLY MAGAZINE OF METALWORKING

OHIO STATE UNIVERSITY
FEB 26 1952
LIBRARY

TONE DOWN NOISE
—Tune Up Production

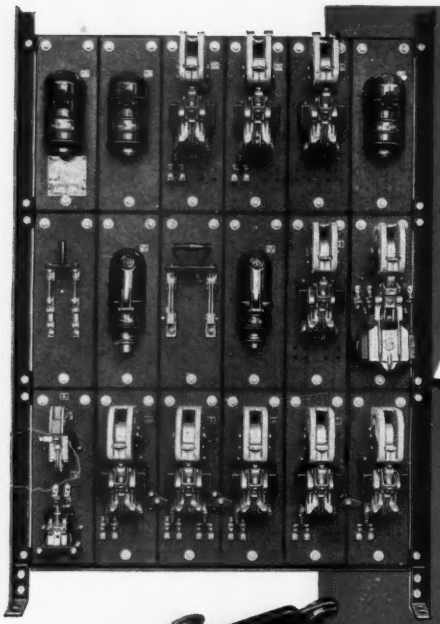
—See page 76



METALS, WAGES, PRICES
—Decontrol Timetable Takes Shape, p. 47

STEEL WAGE SETTLEMENT
—Will Tide Sweep Small Firms? p. 49

ONE SETUP MILLING
—Machining Time Is Sliced, p. 80



LOOK for these NAMES when buying Motor Control

1 LINE-ARC Contactors
2 TIME-CURRENT Acceleration (D-c)
3 FREQUENCY RELAY Acceleration (A-c)
4 WRIGHT CIRCUIT Hoist Control (D-c)
5 YOUNGSTOWN Hoist Limit Stops
6 TYPE WB Brakes
7 CAM Master Switches
8 MANUAL-MAGNETIC Disconnect Switches
9 CONTRA-TORQUE Hoist Control (A-c)
10 TAB-WELD Resistors

These FUNCTIONAL NAMES Speak for Themselves

TIME-CURRENT
CONTROL for D-c Motors

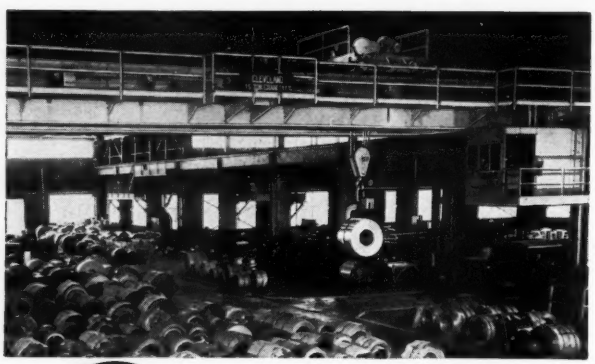
Aids *OUTPUT*

Motors accelerate *fast* from a *standing* start — *quicker* from a *coasting* start with NO change in relay adjustment.

Only one moving part in the TIME-CURRENT acceleration relays — magnetically centered in its short movement.

Top view of relay (with hinged cover removed) showing relay contacts in normal position.

Watch a TIME-CURRENT Controlled crane operate, or better still take a ride on one, and note the outstanding performance of this self-timing system of control. From a standing start, the crane gets under way easily with normal time per step for smooth acceleration. Put the master switch in "neutral" and coast. Then re-apply power for travel in the same direction—reduced time for each step results in *quicker* acceleration than from a standing start. This is an *exclusive* characteristic of EC&M TIME-CURRENT Control and operators use it to advantage in taking the swing out of a load, in making quick moves where fast response is valuable to increased output. For new cranes, or when revamping existing installations, specify EC&M Control.



15-Ton Mill Crane responds quickly under EC&M Control.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

66,000 lb Table Girder Made By Welding

This huge chunk of steel is a table girder, for use in a rolling-mill runout table. It is 43 ft long, 4 ft, 2 in. deep, and 13 ft, 6 in. wide, and weighs 66,000 lb. It was produced largely by welding.

The machinery you build or the parts you need may not compare with this table girder in size. But whatever you require, and no matter how intricate it may be, it will be well worth while for you to look into the advantages of Bethlehem Weldments.

We'll be pleased to discuss weldments with you in detail. Drop a line to the nearest Bethlehem office, stating when you would like our representative to call.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

FOUR BIG ADVANTAGES OF BETHLEHEM WELDMENTS

1. With Bethlehem Weldments, excess weight and unduly large sections are eliminated without any sacrifice of rigidity. What's the result? A definite dollars-and-cents saving, because the cost of the finished machine is correspondingly reduced.

2. Bethlehem Weldments are extremely versatile. They can be made in a wide range of sizes, for use as simple parts or in assemblies.

3. With Bethlehem Weldments you get complete freedom of design. This is because the steel can be bent, pressed, or otherwise shaped prior to welding, without harm to its physical structure.

4. Bethlehem Weldments can be used alone, or with forgings or castings.

BETHLEHEM STEEL

BETHLEHEM WELDMENTS

You'd smile, too, checking these specials

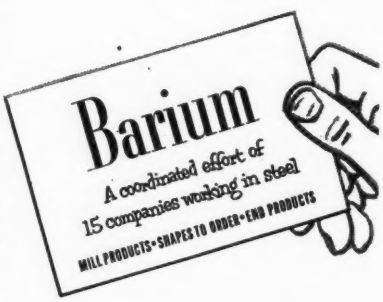
Inspectors at Barium's Erie Bolt and Nut Company have an excellent reason for smiling.

They're pleased to see how precisely Erie's special fasteners meet customer specifications.

Not only alloy steel specials like the bolts shown, but commercial bolts and studs successfully pass their rigid inspection . . . because all Erie products are made by Erie's famous-for-quality production techniques.

As an important member of the family of Barium subsidiaries supplying industry with steel in many forms, Erie must be quality-conscious. For Barium controls quality from blast furnace to finished product.

Think of Barium as a single source for steel, ready to work as a self-contained unit to speed urgently needed orders. Address your steel needs (see below for Barium's wide range of services) to Barium at 25 Broad Street, New York City.



BOLTS — Bayonne Bolt Corporation

STEEL PLATE — Central Iron and Steel Company

PIG IRON — Chester Blast Furnace

CRANES AND HOISTS — Clyde Iron Works, Inc.

SPRINGS — Cuyahoga Spring Company

BOLTS AND NUTS — Erie Bolt and Nut Company

METAL STAMPINGS — Geometric Stamping Company

DROP FORGINGS — Globe Forge, Inc.

HEAVY FLAT DIE FORGINGS — Industrial Forge and Steel, Inc.

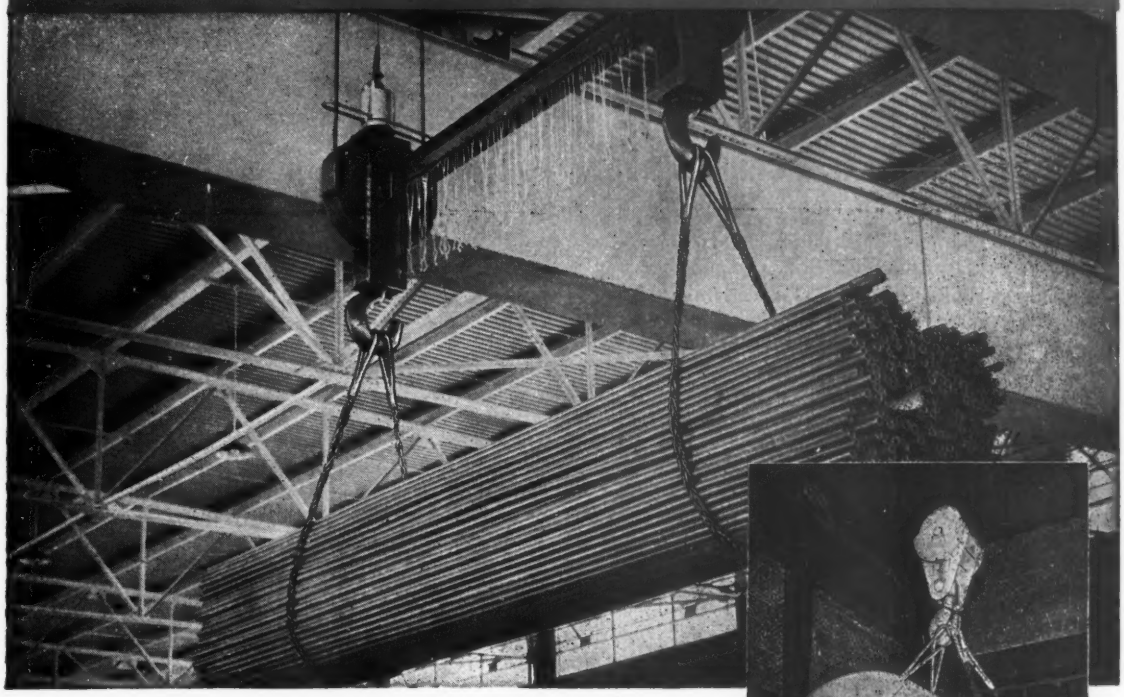
AIRCRAFT ENGINES AND PRECISION ASSEMBLIES — Jacobs Aircraft Engine Corporation

MARINE DIESEL AND GASOLINE ENGINES — Kermath Manufacturing Company, Kermath Limited (Canada)

STRUCTURAL SHAPES AND STEEL FABRICATIONS — Phoenix Bridge Company, Phoenix Iron and Steel Company

BARGES AND TUGS — Wiley Manufacturing Company

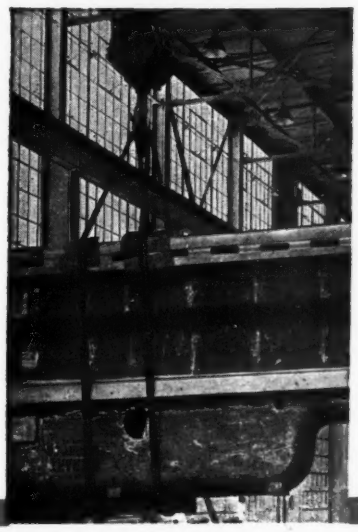
MACWHYTE SLINGS AT WORK



Macwhyte DREW Type 1 Flat-Braided Slings handle loose bundle of steel pipe

125-ton generator unit handled with Macwhyte ATLAS Type 1 Round-Braided Slings

Macwhyte MONARCH Cable-Laid Grommets handling large casting



In hundreds of plants across America, Macwhyte Wire Rope Slings are standard lifting equipment. These slings are made to order to handle any type or size of load. A special braided construction, developed by Macwhyte, assures maximum flexibility and safety. For sling recommendations call a Macwhyte distributor or write to Macwhyte Company. Catalog on request.

MACWHYTE COMPANY

2912 Fourteenth Avenue, Kenosha, Wisconsin. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Distributors throughout U.S.A. carry stocks for immediate delivery.

Member National Safety Council

For cranes and hoists use PREformed Monarch Whyte Strand Crane Rope made by Macwhyte.

5 Times the Service

driving air conditioning blower

CONVENTIONAL belts failed in 4 months, due to heavy overload.

G.T.M.— Goodyear Technical Man — specified Steel Cable V-Belts with load-carrying cables of airplane-type steel to handle this problem drive. Steel Cable Belts lasted 20 months 2 days—*gave five times the service.*

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS *built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your telephone directory.*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"— Every Sunday — ABC Network

STEEL

The Weekly Magazine of Metalworking

VOL. 130 NO. 8 **FEBRUARY 25, 1952**

THIS WEEK IN METALWORKING

NEWS

Behind the Scenes 6
Letters to the Editors 12
Metalworking Outlook 39
As the Editor Views the News 43
The Metalworking Contract Summary 52
Checklist on Controls 53
Windows of Washington 54
Mirrors of Motordom 61
The Business Trend 65
Men of Industry 69
Obituaries 72

PRODUCTION-ENGINEERING

Production-Engineering News at a Glance 75

What's the effect of industrial noise? There's not complete agreement, but chances are energy is being spent for other than useful purposes .....

Tone Down Noise, Tune Up Production 76

Buick finds investing in new equipment pays off in production gains in its sheet metal plant .....

Machinery Changes Revitalize Sheet Metal Plant 78

Field trouble is minimized, closer tolerances achieved by producing huge weldments to standards associated with machine tool building .....

One Setup Milling Slices Machining Time on Complex Machines 80

Porcelain enamelers can now have closer control of their furnaces during production runs .....

Firing Temperatures Controlled 82

An answer to the rust problem on steel drums was found by Wheeling Steel .....

Corrosion-Resistant Mist: Must for Preventing Rust 83

In the gas phase of blast furnace operations the principles of gas producers govern gas production .....

Progress in Steelmaking
Blast Furnace Practice—Part VI (b) 88

Calendar of Meetings 118
New Products and Equipment 123
Helpful Literature 129

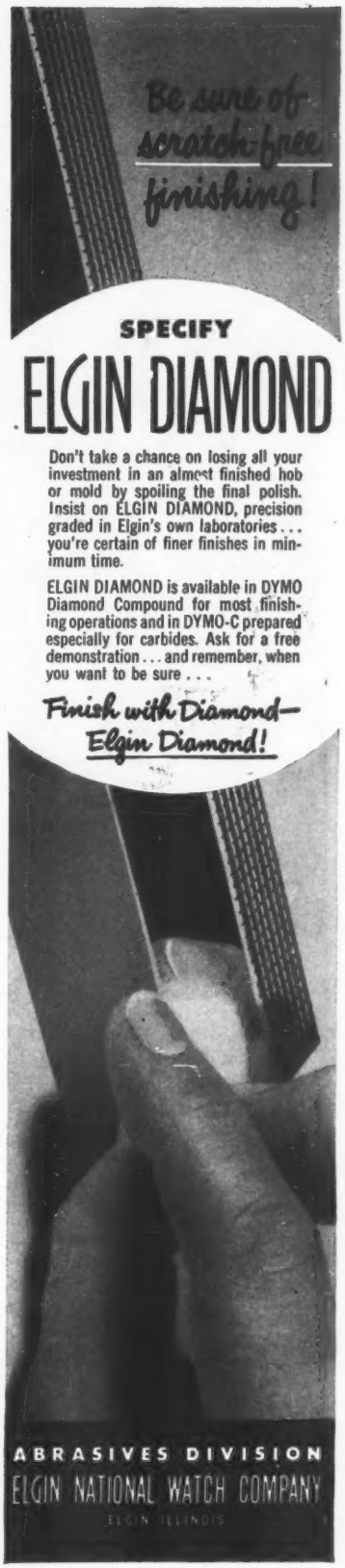
MARKETS

The Market Outlook 133
Metal Prices and Composites 134
Nonferrous Metals 145
Metalworking Briefs 155

Editorial and Business Staff—Page 10. Advertising Index—Page 162. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

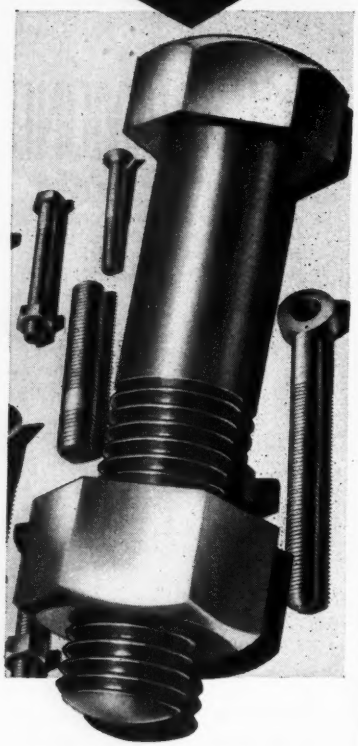
Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879.

Copyright 1952 by Penton Publishing Co.


Be sure of scratch-free finishing!
SPECIFY
ELGIN DIAMOND
Don't take a chance on losing all your investment in an almost finished hob or mold by spoiling the final polish. Insist on ELGIN DIAMOND, precision graded in Elgin's own laboratories . . . you're certain of finer finishes in minimum time.
ELGIN DIAMOND is available in DYMO Diamond Compound for most finishing operations and in DYMO-C prepared especially for carbides. Ask for a free demonstration . . . and remember, when you want to be sure . . .
Finish with Diamond—Elgin Diamond!
ABRASIVES DIVISION
ELGIN NATIONAL WATCH COMPANY
ELGIN ILLINOIS

LORD HALL LIBRARY

First for
BOLTS
NUTS
STUDS



★ Carbon Steel
★ Heat-treated Alloy Steels
★ Stainless Steel
★ Silicon Bronze
★ Naval Brass
★ Monel Metal

You can count on a uniform Class 3 Fit when you buy Pawtucket threaded fasteners. Accurately made in standard dimensions — or to your specifications.

BETTER BOLTS SINCE 1882

Use Headed and Threaded Fasteners for Economy and Reliability

PAWTUCKET
"THE BOLT MAN"
MANUFACTURING COMPANY
327 Pine Street · Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

Behind the Scenes...

Hazards of Editing

Associate Editor Ed Karpick turned in a fine story, we thought, when he wrote about some lathes of a new design. (STEEL, Feb. 11, p. 86). The article illustrates one of the occupational hazards of being an editor. In the story R. K. LeBlond Machine Tool Co.'s special lathe was called a turbine wheel lathe—the way it was designated at the time Ed interviewed the folks at LeBlond. The LeBlond lathe later was more accurately discribed as a Contour Facing Lathe. LeBlond sent a telegram to Ed on Saturday, Feb. 9, requesting a change, if possible. Alas, we had already gone to press! If you haven't seen the story, we suggest you take a look.

Dan Cupid

STEEL is playing cupid. We found that out in connection with a routine letter we send periodically to subscribers to find if each issue is arriving promptly and if the name, title and address are correct.

One letter came back pointing out that our "Mr." X should be "Miss" X. Our subscriber says she is "just a gal with a complex for boosting the man in her life in his particular job, assistant roller in the cold reduction mill of a steel company. He did not have the chance to get a college education, so feels that anything much more advanced than his own job is out for him." She is trying to get him to pull himself up by his own bootstraps by realizing there's vast opportunity in metalworking "by cutting clippings from the press (from STEEL for the most part) to interest him in the overall industrial picture in the hope that someday his greater knowledge will help him."

STEEL, we think, is playing a part in subversive activities there, but in this case it's fine with us.

Puzzle Corner

In our Feb. 11 puzzle, the envelopes contained $1, $2, $4, $8, $16, $32, $64, $128, $256 and $489. First in with that answer were T. S. Bean of Barber & Ross Co., E. Buschow of Surface Combustion Corp., W. R. Coates Jr. of Edgewater Steel Co., Lewis D. Rice of Timken Roller Bearing Co., D. K. Hallauer of Service Iron & Steel Co., J. L. Quarterman of E. I. du Pont de Nemours & Co., C. A. Nichols of Peden Iron & Steel Co., R. Vecciarelli of Mohawk Steel Co. Inc., and George Snyder of Ritter Co. Inc.

Here's this week's puzzle: General Bienne of Graustark has 100 military units under his command. There are three garrison towns in Graustark, bearing the names of Day, Night, and Morrow. On July 1 the General's units were distributed among the three towns. At 8 a.m. that day (0800, military time) he broadcast this order, "UNITS NOW AT DAY WILL PROCEED TO NIGHT TO MORROW STOP UNITS NOW AT MORROW WILL PROCEED TO DAY TO NIGHT STOP UNITS NOW AT NIGHT WILL PROCEED TO MORROW TO DAY."

At 6 p.m. (1800) he broadcast, "ORDERS GIVEN THIS MORNING FOR UNITS TO PROCEED TO NIGHT ARE CANCELLED AS FAR AS UNITS WHICH HAVE NOT YET MOVED ARE CONCERNED," And at midnight (2359) he announced, "UNITS WHICH WENT TO DAY TO NIGHT WILL RETURN AT DAYBREAK TO MORROW."

The General's idea of "day" (considered as a time unit) is the period ending at 6 p.m. (1800). "Night" is the period between 6 p.m. and midnight.

On July 3 the distribution of the General's forces was: at Day, 26 units; at Night, 24 units; at Morrow, 50 units. Assuming that where an order appears to be capable of two interpretations, half the units commanders to whom it might apply interpret it in one sense and half in the other. What was the distribution of the forces at 8 a.m. on July 1?

On Tree Stumps

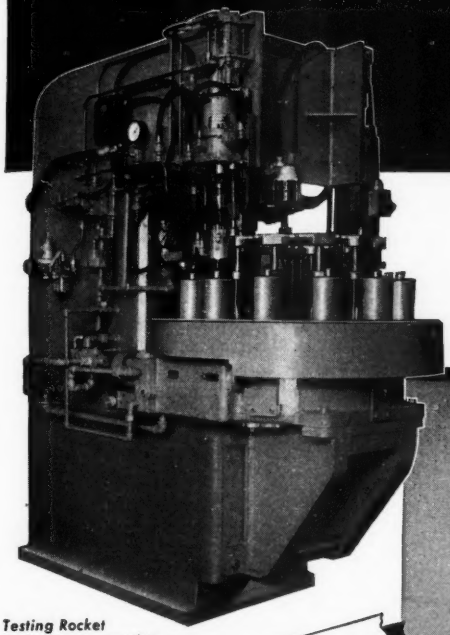
You will be relieved to learn that OPS has just decontrolled prices of tree stumps. In a two-page explanation of the action (official exemption and new release interpreting the official language), a stump is defined as "the residue of a tree after it has been severed from the stem or trunk."

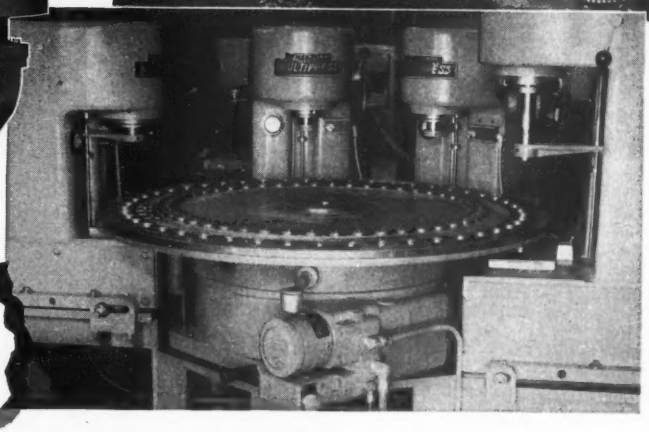
Shrdlu

(Metalworking Outlook—Page 39)

DENISON INDEX TABLES

—*multiply* production speeds by faster *continuous* parts loading





Testing Rocket Bodies Hydrostatically—Automatically—

A Production Tip for Better Ordnance and Industrial Jobs

adds further versatility to the rapid action of

MULTIPRESS®

Thousands of Multipress users are daily proving—on both industrial and ordnance jobs—that automatic rotary feeding of parts is a sure way to speed up production . . . *and do it safely.* Synchronized and interlocked with the machine action, the table automatically turns, simultaneously carrying one loaded part to the work station and the preceding part on to the ejection station where it is either manually or automatically ejected.

As illustrated above, one or several operators working safely out of reach of the ram action, simply load parts or multiple-part assemblies into holding fixtures evenly spaced around the dial. No lost machine production time for loading or unloading the work in process!

Likewise, where the work requires progressive machine operations, more than one production unit can be placed at different work stations around the table.

Rotated by oil hydraulic power at speeds from 10 to 70 indexes per minute and available in six or twelve station models, the Denison Index Table has wide application. But combined with Multipress—with its wide range of ram action, and 8 frame sizes in capacities from 1 to 50 tons—you have a high speed production machine adaptable to almost unlimited application. One worthy of investigating today! Write.

It's Also An Ideal Rotary Feed For Other Types of Equipment!

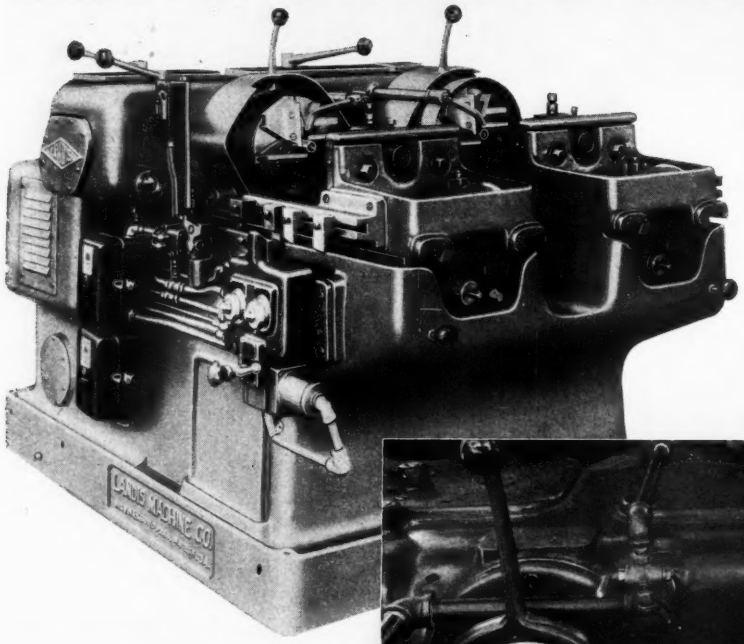
DENISON Hydr OILics

The DENISON Engineering Co.

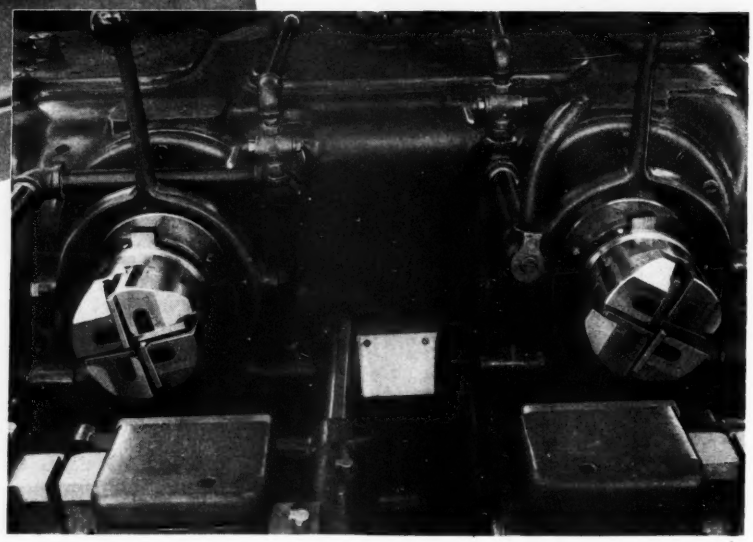
1163 Dublin Rd., Columbus 16, Ohio

HOLLOW MILLING

Extra LANDIS Feature . . .



LANDIS Die Heads, in addition to conventional threading operations, can be equipped with LANDIS Turning Cutters which will perform turning, grooving, forming, and facing by the hollow milling method. Milling operations may be performed by LANDIS Heads applied to automatic screw machines, turret lathes, or LANDIS leadscrew-type or hydraulic-feed threading machines, and other positive-feed-type machines.



Many Production Advantages

Hollow milling by this method offers an increased efficiency occasioned by the application of a multiple number of cutting tools. The feed rate is thus approximately equal to that of a single tool, multiplied by the number of simultaneously-functioning cutters in the unit—four or six for LANDIS Heads.

The LANDMACO Double Head Leadscrew Threading Machine affords a particularly efficient hollow milling method. One carriage will perform the milling operation while the other carriage is being loaded by the operator, thus allowing consistent continuous production. In addition it is entirely practical to perform milling operations on one spindle and conventional threading operations on the other.

LANDIS Turning Cutters

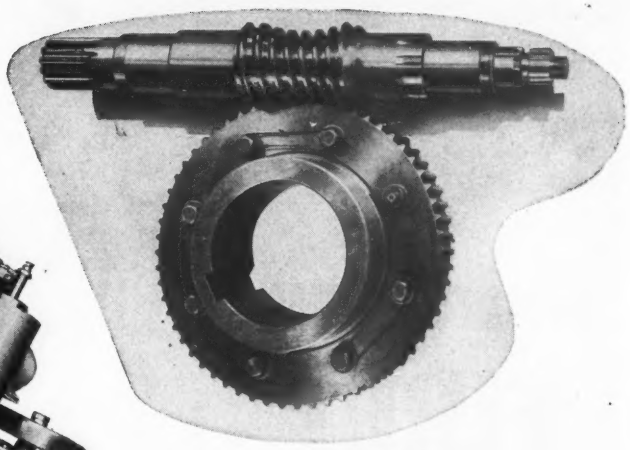
LANDIS Cutters are economical tools for they are usable for most of their original length. Only the rake angle needs regrinding—a quick and simple procedure. One set of cutters will machine a wide diametrical range of work, and cutting speeds will range from 30 to 70 linear feet per minute.

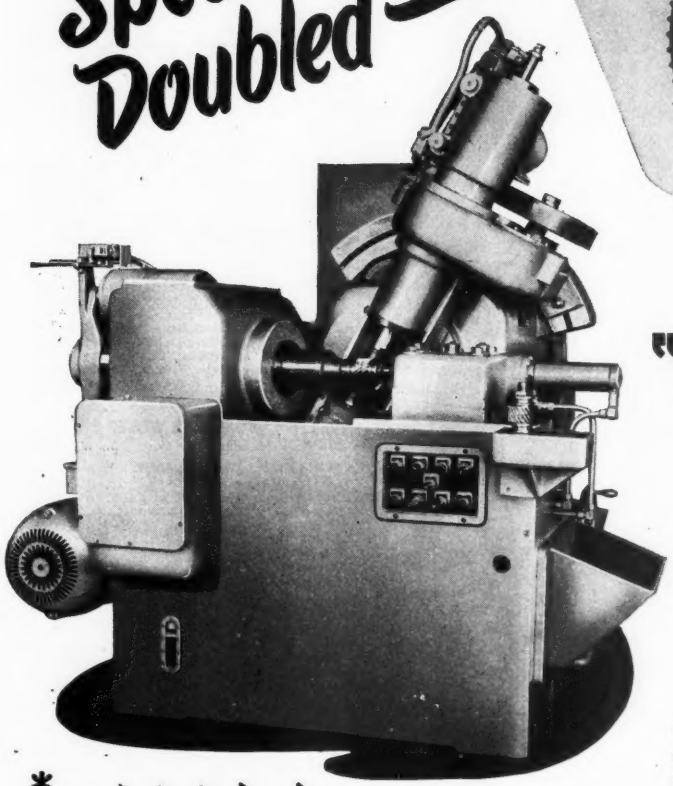
Wear and breakage of tools and spoiled work is held to a minimum. The cutting edges of the cutters can be precisely and uniformly located with relation to the center line of the work since they are diametrically-opposed in the cutting position. Thus with cutting strains evenly distributed, the workpiece is never forced out of alignment.

Additional information will be supplied on request—please include specifications.

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

Machine Speed Doubled*—





with "hydraulically" smooth CONE-DRIVE gears

ON the gear hobber illustrated here, high speed steel hobs are now run at CARBIDE SPEEDS—without sacrifice in hob life.

*and tripled

In addition to taking out vibrations, Cone-Drive Gears in this machine also made possible a large reduction in number of gears required in the drive.

Impossible? Not when 'hydraulically' smooth DOUBLE-enveloping Cone-Drive gears are used. The main drive and index drive in this machine use Cone-Drive gears and are so smooth that the usual high-frequency vibrations caused by gearing are eliminated, to all practical purposes.

This vibration-free drive made it possible to run high speed steel hobs efficiently at several hundred feet per minute cutting speed instead of the usual 80 or 90.

That same 'hydraulic' smoothness can do wonders for your machines, too. You can obtain it either through designing standard double-enveloping Cone-Drive gears into your machines or by using complete Cone-Drive reducers instead of built-in gearing.

We will be glad to study your designs for the simplest way to apply the advantages of DOUBLE-enveloping Cone-Drive gears to your equipment.

CONE-DRIVE GEARS
Division, Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNichols Road • Detroit 12, Michigan

WHERE'S THE FIRE?

There are danger spots in every building (yours, too!) where fire is most likely to strike. These spots can be guarded day and night by a Kidde Automatic Fire Extinguishing System.

At the first sign of flame the Kidde system releases carbon dioxide (CO_2) which blankets the fire—literally smothers it instantly. You can protect several spaces with a single Kidde system...or have separate protection for such hazards as a dip tank or generator.

With a Kidde System, there is no water damage, no messy residue to ruin costly machinery, electrical equipment or documents. And that means no interruption in production. Find out more about Kidde Fire Protection today. Write to:

Walter Kidde & Company, Inc.
260 Main Street, Belleville 9, N. J.

Kidde

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

STEEL

EDITORIAL STAFF

Editor-in-Chief.....E. L. SHANER
Editor.....IRWIN H. SUCH
Managing Editor.....WALTER J. CAMPBELL
Market Editor.....WM. M. ROONEY
Engineering Editor.....WALTER TOERGE
Steel Plant Editor.....J. D. KNOX
Consulting Editor.....ALLEN G. GRAY
Art Editor.....DON S. CADOT

Associate Editors:

FRANK R. BRIGGS
VANCE BELL, JOHN S. MORGAN
EDWARD C. BIRKNER, EDWIN L. KARPICK

Assistant Editors:

SAMUEL W. BAKER, WILLIAM R. WOLFE
DOLORES K. MAILLE, M. T. BORGERHOFF
ARTHUR W. ZIMMERMAN, ROBERT E. HALL
JOHN KELSEY, ROBERT O. JAYNES
L. J. SKUDERIN

Resident Editors:

Washington.....E. C. KREUTZBERG
New York.....B. K. PRICE, L. E. BROWNE
Pittsburgh.....DAN REEBEL
Detroit.....H. C. TUTTLE
Chicago.....E. F. ROSS
London, European Editor.VINCENT DELPORT

Editorial Corespondents:

Birmingham, R. W. Kincey; Buffalo, L. G. Feldmann; Cincinnati, Samuel S. Carr; St. Louis, Mac L. Hutchens; Youngstown, George R. Reiss; Los Angeles, Norman Lynn; San Francisco, Edwin Haverty; Seattle, R. C. Hill; Dallas, C. K. Cates; Toronto, F. S. Tobin; Birmingham, Eng., J. A. Horton; Paris, France, Leon Jaudoin; Liege, Belgium, Jacques Foulon; Dusseldorf, Germany, Herbert Gross.

BUSINESS STAFF

Business Manager.....J. W. ZUBER

Advertising:

Service Manager.....C. H. BAILEY
Production Manager.....A. V. ANDERSON
New York E. W. KREUTZBERG, K. A. ZOLLNER
CALVIN FISHER JR.
Pittsburgh..S. H. JASPER, H. G. ROWLAND
J. C. SULLIVAN
Chicago.....L. C. PELOTT, W. L. POLAND
Cleveland...D. C. KIEFER, H. G. ROWLAND
C. A. TALLINGER
Los Angeles.....F. J. FULLER
Griffin, Georgia.....FRED J. ALLEN

Market Research and Promotion:

Promotion Manager.....E. L. FRANKE
Market Statistics.....GEO. J. AUNER
Market Surveys.....WYNN SULLIVAN
Mail & List Service.....BETTY HINTON

Circulation Department:

Manager.....G. R. EBERSOLE
Field Representatives.....H. R. DUNNE,
D. G. HEWITT, C. A. PRICE, T. R. WARREN

Main Office:

Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices:

New York 17.....60 East 42nd St.
Murray Hill 2-2581
Chicago 11.....520 North Michigan Ave.
Whitehall 4-1234
Pittsburgh 19.....2837 Koppers Bldg.
Atlantic 1-3211
Detroit 2.....6560 Cass Ave.
Trinity 5-3024
Washington 4.....1123 National Press Bldg.
Executive 6849
Los Angeles 48..6262 Commodore Sloat Dr.
Webster 1-6865
Griffin, Georgia.....331 South 12th St.
London, 2 Caxton St., Westminster, S.W. 1

Published by

THE PENTON PUBLISHING COMPANY

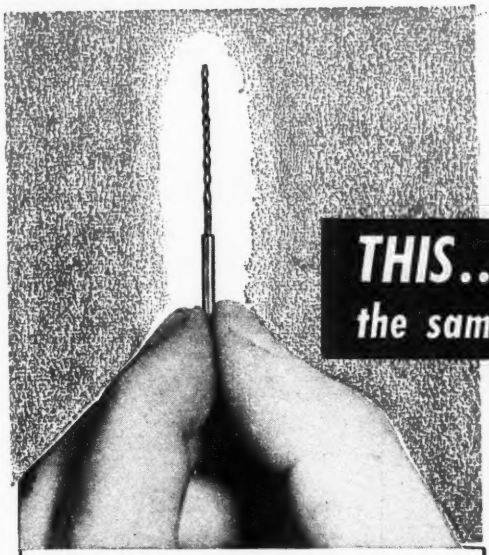
Chairman.....E. L. SHANER
President and Treasurer.....G. O. HAYS
Vice Pres., Director of Adv...R. C. JAENKE
Vice Pres. and Secretary..F. G. STEINEBACH
Asistant Treasurer.....R. W. COLEMAN

Also publisher of

FOUNDRY •, MACHINE DESIGN
NEW EQUIPMENT DIGEST

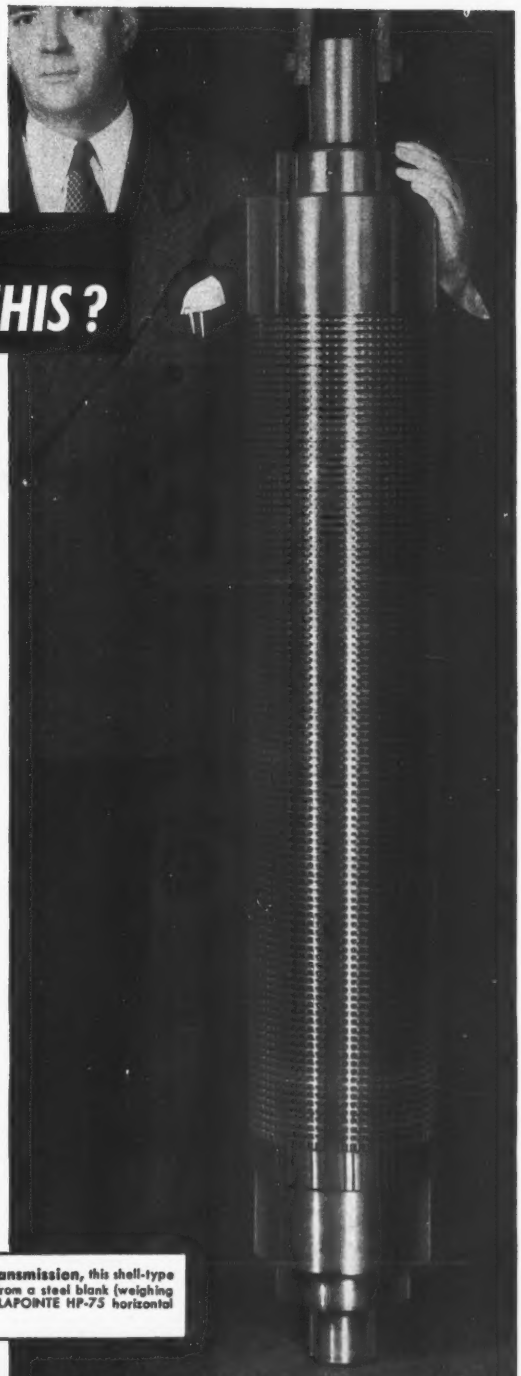
CCA NBP

Member, Controlled Circulation Audit Inc., National Association of Magazine Publishers, Society of Business Magazine Editors, and National Business Publications Inc.



To clean up the gas nozzle in the carburetor of one of the world's most popular makes of automobiles, this "mighty midget" of a broach is only .042" in diameter . . . has 3 cutting teeth, 4 burnishing teeth.

THIS... the same as THIS?



Of course there's a dramatic difference in size and purpose, but basically they're *just alike* . . . both are LAPOINTE *quality broaches!*

LAPOINTE makes a full range of sizes and types of broaches, but there's *only one quality;*

LAPOINTE makes a full range of broaching machines — more than 50 standard models — but there's *only one ideal:* perfection . . .

LAPOINTE makes a full range of fixtures, but there's *only one objective:* simple, fast, safe operation!

LAPOINTE — the world's oldest and largest manufacturer of broaching machines and broaches — can take full responsibility for your complete broaching needs: and there's *only one LAPOINTE!*

BROACHING GIVES YOU the maximum in production speed, together with unequalled repetitive accuracy to close tolerances.

To broach clutch plates for tank transmission, this shell-type broach has 69 splines . . . was formed from a steel blank (weighing nearly half a ton) and is used on a LAPOINTE HP-75 horizontal Broaching Machine, 37½ Ton.

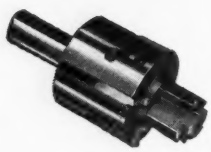
THE Lapointe MACHINE TOOL COMPANY

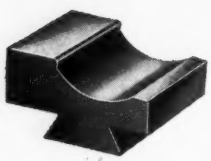
HUDSON, MASSACHUSETTS, U. S. A.

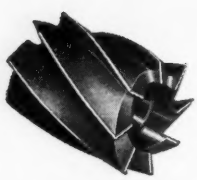
Branch Factory: Watford, Herts., England

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

with *Gorham*-ENGINEERED SPECIAL CUTTING TOOLS







Next time you're up against a tough tooling problem, call in the man who can give you *the right answers fast* . . . your nearby Gorham Field Engineer! He's an expert in special cutting tools . . . and he's ready to provide a complete engineering service to determine your exact tooling requirements. He starts with your product, sketch or idea. He surveys your production operations and available equipment. He considers work material properties and desired finishes and tolerances. He plots proper machine feed, speed and method of tool driving. Then he develops practical design and engineering specifications for special cutting tools, metallurgically "tailor-made" for your application.

His recommendations are backed by Gorham's unmatched facilities, which include three fully-equipped modern plants, a large Engineering and Metallurgical staff, and a force of field application engineers in principal industrial centers, coast-to-coast. All are dedicated to furnishing prompt and profitable solutions to your special tooling problems. Gorham-engineered "specials" are turning problems into profits in thousands of plants every day . . . why not let them do the same for *you?* If you haven't met your nearby Gorham Field Engineer, write for his name, or send details of your problem direct for recommendations.

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14401 WOODROW WILSON • DETROIT 3, MICHIGAN

LETTERS
TO THE EDITORS

Yearbook Still Draws Comment

I wish to congratulate you on the Metalworking Yearbook issue (Jan. 7). It is an excellent job and I believe should prove helpful to industry in many directions.

Arthur J. Tuscany
Cleveland

Please send three copies of "Metalworking's Destiny" (Jan. 7, p. 115).

P. Tomsick
Carboloy Dept.
General Electric Co.
Detroit

Asking Made Easier

"Yours for the Asking" (The Helpful Literature Dept.) in the issue of Feb. 4 is much improved; one reason being the coupon page is printed on light paper. May I suggest another improvement. You might run the masthead and Letters to the Editor following "Contents", as these two headings are hard to find in their present positions.

Lloyd Jaeger
Toronto, Ont.

Comparisons of Stainless

We need comparable information on the production of stainless steel including producers, types of stainless and tonnages. Will you kindly advise how we can obtain this information.

H. J. Prosser
Carborundum Co.
Niagara Falls, N. Y.

• *You can get some of the information you need by referring to the market price pages of* STEEL. *American Iron & Steel Institute's Form 104 gives production figures of stainless and the Institute's AIS 10S is a monthly report on shipments of stainless steel by product form.*

Pellets for England

We are interested in the taconite pelletising process on which, we've been advised, you have published articles recently. We would appreciate references to this material.

F. B. Karthauser
National Coal Board
London, England

• *You can obtain the information from our London office at 2 Caxton St., Westminster S. W.1. Vincent Delport is managing editor of our London office.*

Who and Where Department

I would like to have any additional information available relating to your article "Salt Sans Rust" (Dec. 31, p. 51).

W. A. Faust
assistant works engineer
Linde Air Products Co.
Tonawanda, N. Y.

• *Write to Hagan Corp., 3300 Hagan Building, Pittsburgh.*

Manpower problem solved

BY WARNER & SWASEY AUTOMATICS

● At Otis Elevator Company, 6 Warner & Swasey 5-spindle Automatics replaced 17 older machines—and 6 critically needed men were released to work elsewhere in the plant.

These automatics are used at Otis for short runs on specially machined parts—studs, bolts, nuts and other screw machine products—required for custom-made elevators. And only 3 men are required to set up and operate these 6 automatics—an important point to consider in today's tight manpower market. Parts are now more uniform, and are produced at a higher rate.

If manpower is one of *your* problems—or if you need new machines to keep pace with present day production demands—have your Warner & Swasey Field Engineer show you just how automatics can fit into your production setup.

The Warner & Swasey 5-Spindle Automatic line at the Yonkers Works of the Otis Elevator Company.

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES

WANTED

3,000 CARLOADS OF IRON AND STEEL

SCRAP

EVERY DAY!

That's what it takes to keep the steel industry producing at its present rate of better than 2 million tons of steel per week. *BUT*, scrap is not coming to the mills in sufficient quantity to maintain this production rate!

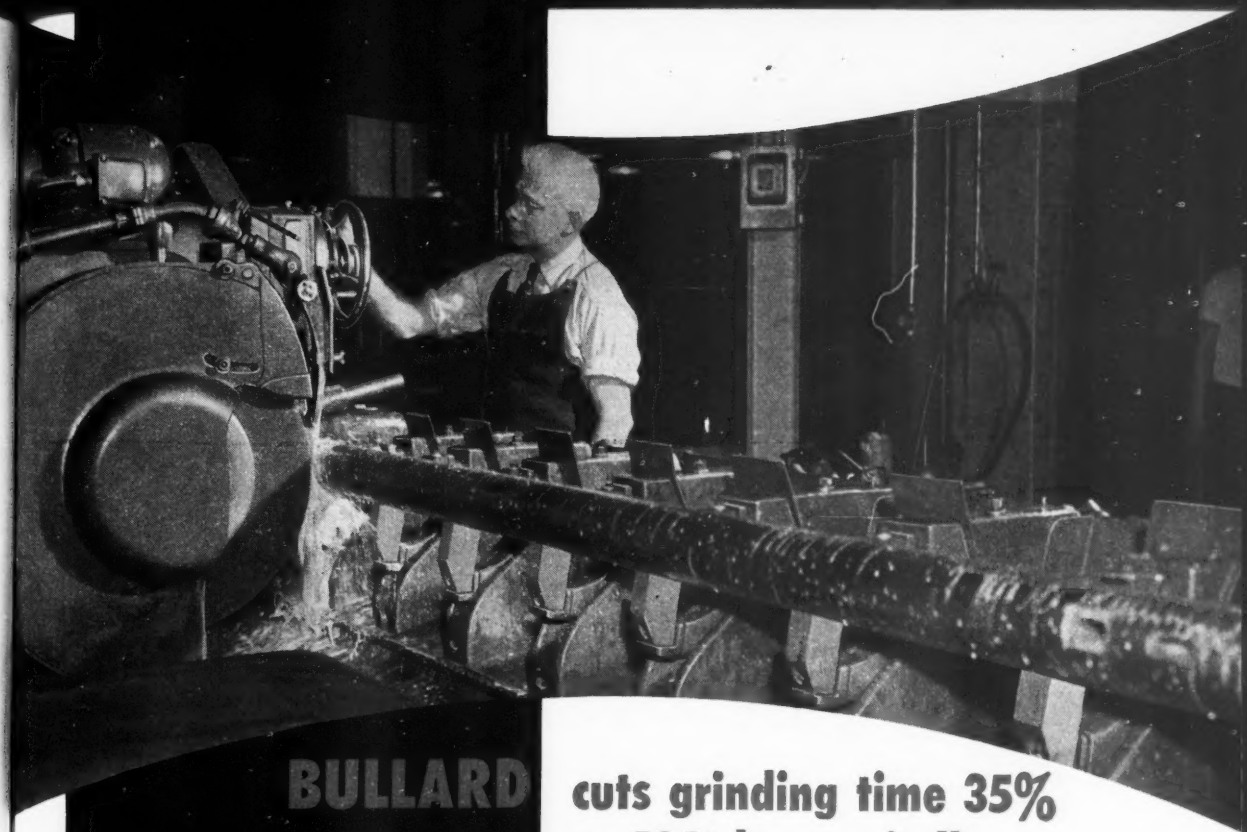
LET'S FACE IT! Unless something is done to alleviate this critical scrap shortage, steel mills throughout the nation will be forced to cut production drastically. Both America's vital defense program and industry in general are certain to suffer a severe blow.

LET'S FIGHT IT! Business and industry can head off the impending crisis by collecting and selling the scrap in their plants. Obsolete machinery, structural steel, old rails and boilers—*all* the iron and steel in your plant that isn't serving a definite purpose should be sold immediately. This is a crisis. The need is urgent. The time for action is *now!*

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



BULLARD

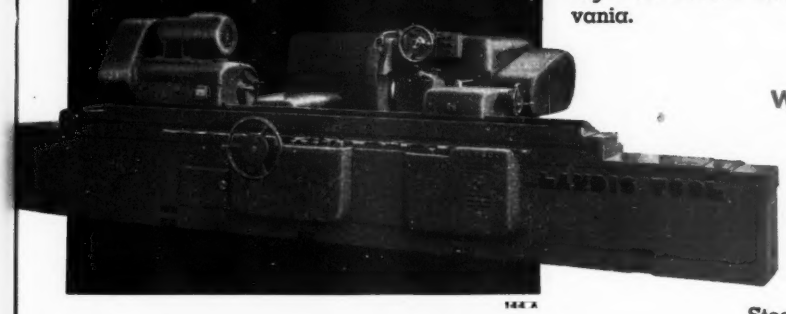
cuts grinding time 35% on 106″ long spindle

Modern Landis Plain Grinder takes heavier cut than possible on old equipment

Two keyways in this long Nitralloy spindle for the Bullard Horizontal Boring Machine help make this a tough grinding job.

Seven work rests are used to maintain straightness and roundness to the .0002″ tolerance. Filler blocks are used in the keyways at each work rest.

Production gains like this can be made on your grinding operations with modern Landis Grinders. Write for Catalog F-48. Landis Tool Company, Waynesboro, Pennsylvania.



144 A

Work Data

Machine	Landis 20″ x 144″ Type F Plain Grinder
Material	Nitralloy—4″ diameter x 106″ long
Stock Removal	.030″ on diameter
Tolerance	.0002″ for roundness and size
Production	7 hours grinding time

LANDIS

precision grinders

"You may have to stand outside!"

REMEMBER Aesop's fable of the camel and his master--how the kind master allowed the shivering beast to put into the tent first his head, next his shoulders, then his forelegs!

And then the camel said, "Master, I think I ought to come wholly inside," and crowded in. Immediately he said, "There is hardly room for us both, so I think it would be better for you to stand outside so I can turn around and lie down." And without further ado, the camel kicked the man out and took the entire tent.

Men have heard this story for 2,500 years--repeatedly have seen how it illustrates what happens when one man or group of men gain power over others. Men saw it happen in Italy and Germany when Mussolini and Hitler took over. Men saw it happen in Russia.

Even here in America a similar trend is evident. Powerful influences overlook no opportunity, through political manipulation, central controls and bureaucratic regulations, to intrude more and more in our private lives. The situation demands continual, alert watchfulness by all citizens who believe in individual liberty and freedom, to prevent this camel of big government from creeping further into the tent. Before we realize it, "we, the people," the master, may find ourselves "standing outside." In America it is government, which is the servant of the people.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

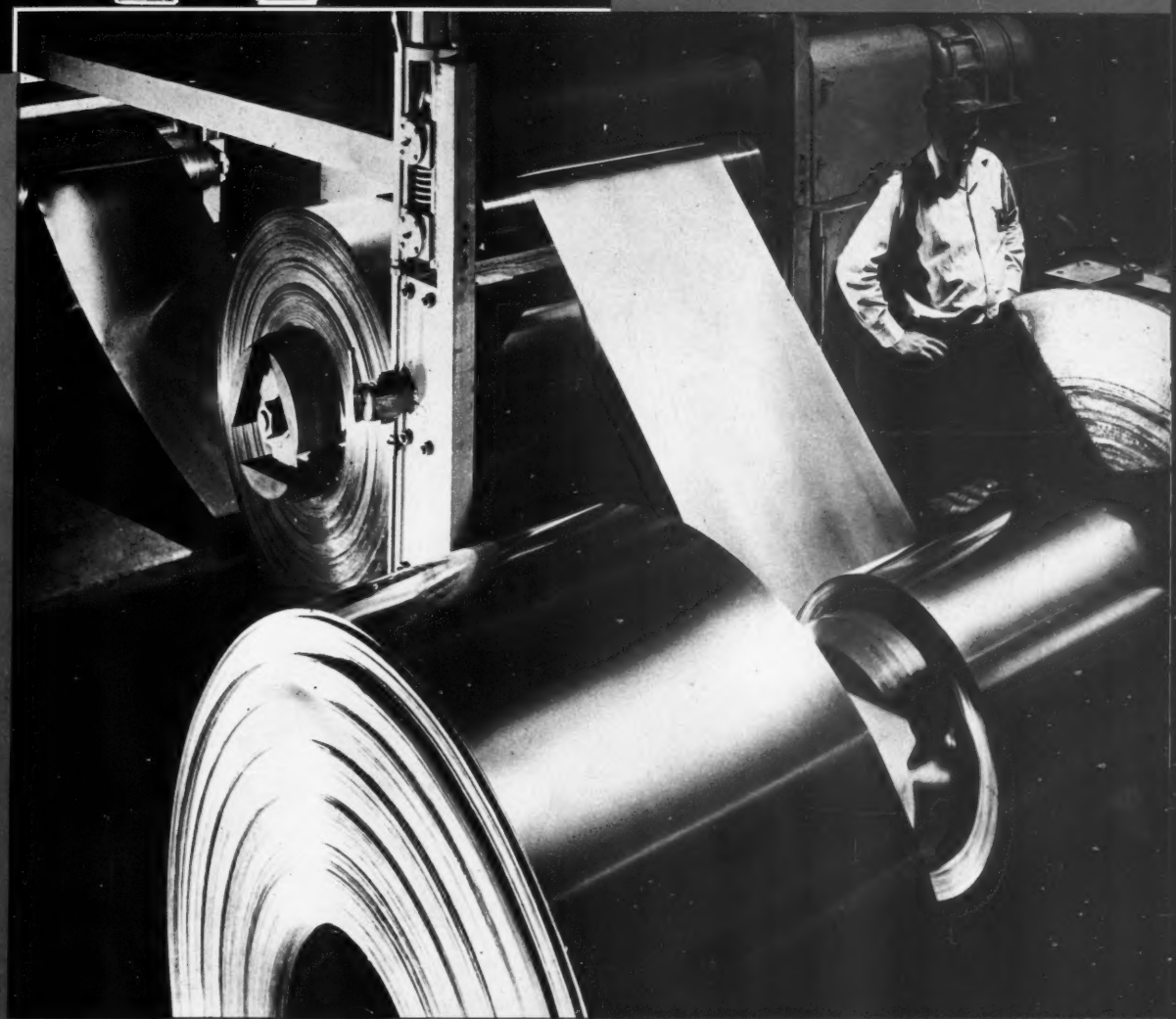
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

WEAN

ENGINEERING Company, Inc.

WARREN, OHIO



The Wean Engineering Company, Inc., Warren, Ohio is a recognized specialist in the design and installation of sheet, tin and strip mill equipment. The expert knowledge and trained imagination of one of the world's most noted steel mill engineering firms is at your service when you specify Wean—whether the job calls for a single piece of equipment or a complete design of an entire line.

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT

Solving industry's toughest problems has been the business of the Wean organization for more than 20 years. The photograph on this page is a typical example of Wean technical skill. The two giant machines—recently featured in *Colliers Magazine* as an industrial triumph—were completely engineered and built by the Wean Equipment Corporation to expedite the construction of Army tanks. They were built to grind and drill a special surface on the tough armor plate. They do the jobs 22 times faster than any previously known method.

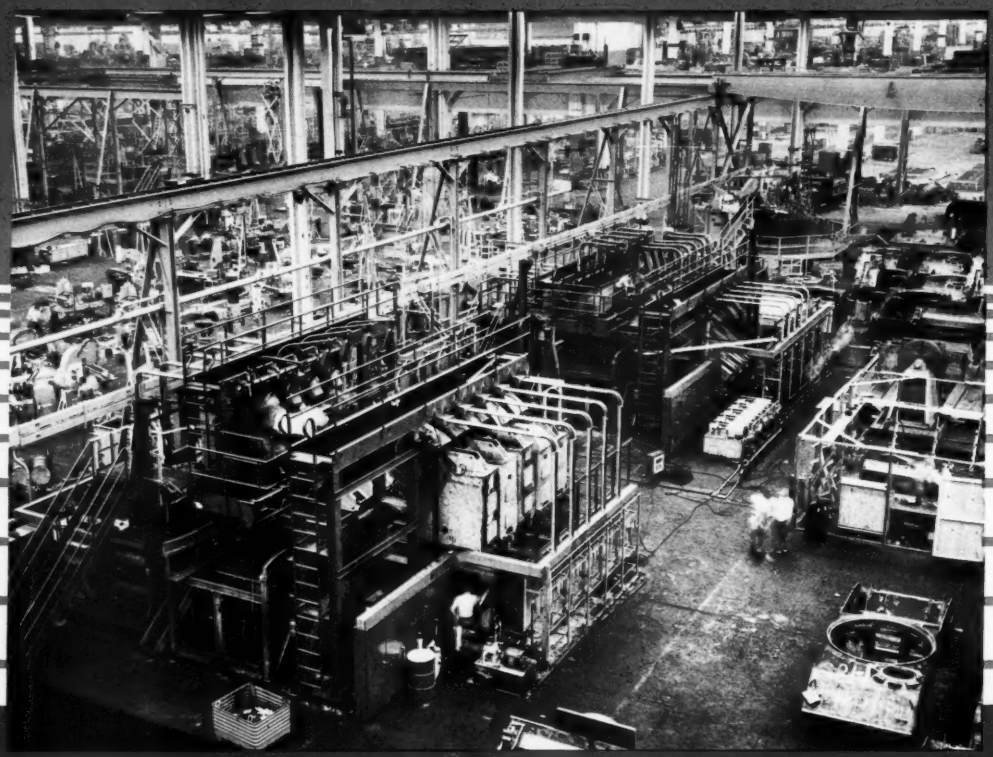
When you have a job that requires special machinery—large or small—you'll be wise to call in a Wean engineer.

WEAN STRIP MACHINERY

SLITTING LINES • SHEARING LINES
BI-METAL COATING LINES • LEVELING MACHINERY
UNCOILING AND RECOILING EQUIPMENT
TRANSFER MACHINING EQUIPMENT
SPECIAL MACHINERY

WEAN WIRE MILL EQUIPMENT

FENCING MACHINERY
WIRE GALVANIZING LINES
BARBED WIRE MACHINERY

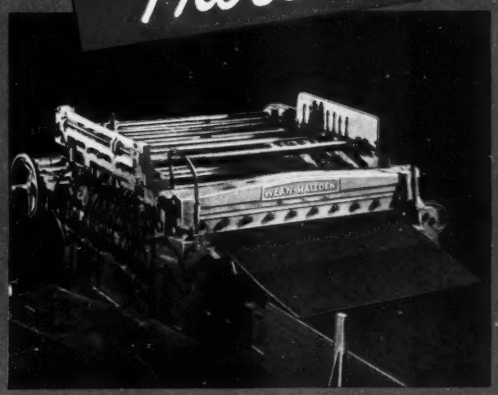


Wean EQUIPMENT Corporation

CLEVELAND, OHIO

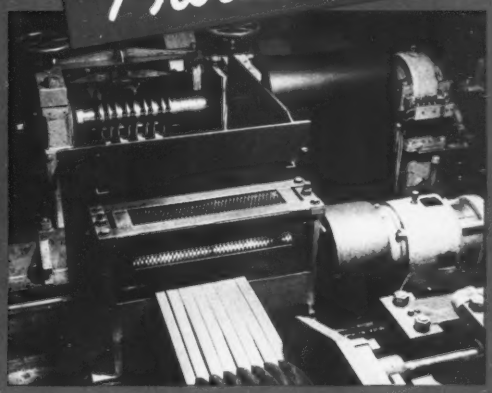
Strip Machinery

Process



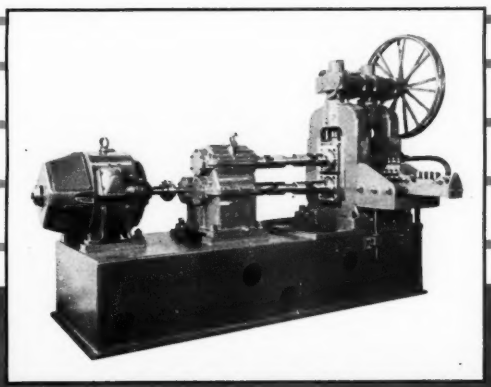
Synchronized Automatic Shear Lines

Product

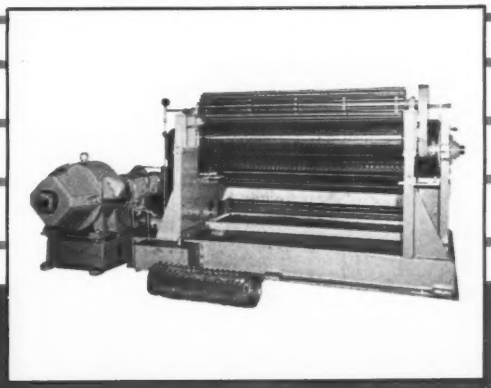


Slitting Lines

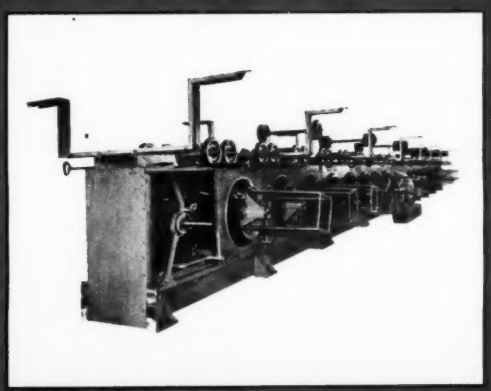
Wire Machinery



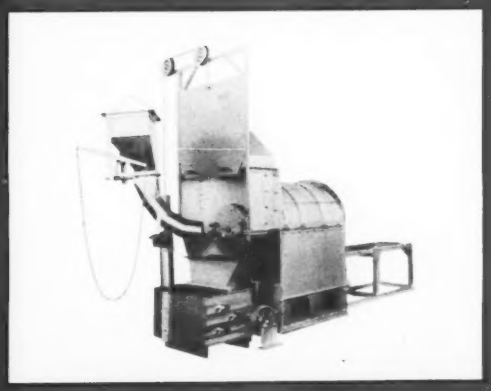
Z-Hi Wire Flattening Mill



Hexagon Netting Machine



Wire Galvanizing Take-Up Frame



Nail Galvanizing Unit

Continuous Strip Pickle Line

Continuous Electrolytic Cleaning Line

WEAN ENGINEERING Company, Inc.

WARREN, OHIO

Continuous Coating Line

Tin Plate Shearing Line

Associate Companies . .

WEAN EQUIPMENT CORPORATION . . . . . Cleveland, Ohio
THE McKAY MACHINE COMPANY . . . . . Youngstown, Ohio
FLINN & DREFFEIN ENGINEERING CO. . . . . Chicago, Illinois
THE HALLDEN MACHINE COMPANY . Thomaston, Connecticut
THE DREVER COMPANY . . . . . Philadelphia, Pennsylvania
THE WEAN ENGINEERING CO. of CANADA, Ltd., Hamilton, Ont.

Representatives . .

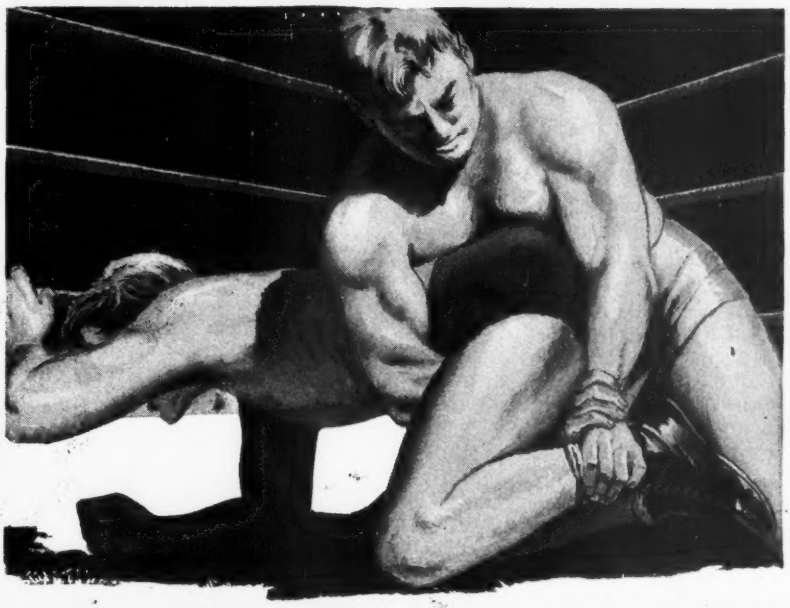
ENGLAND
JOHN MILES & PARTNER (London, Ltd.)
London, England

FRANCE
P. DAMIRON & COMPANY
Paris, France

ITALY
NORVIL COMPANY
Milan, Italy

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT

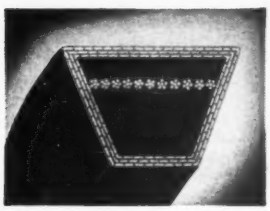
Dayton Cog-Belts* *bend* better...*are* better!



Dayton raw-edge Cog-Belts are the *only* V-Belts scientifically designed to bend as easily as your finger. The cogs "close up"—take up the compression as the belt goes around the pulley. Result: Less strain . . . cooler running . . . smaller pulleys . . . 40% more horsepower . . . much longer belt life.

See HOW MUCH better Cog Belts are!

This V-Belt drive transmits the power from two diesel engines to a dredge pump, which delivers 100 cubic yards of sand and gravel per hour. The former drive used 16 ordinary V-Belts which were capable of handling 140 constant horsepower. But the dredging company wanted to step this up to 188 horsepower, to meet new production requirements. Trouble was, the increased load meant adding more belts—*and there was no room for pulleys with more grooves!* The Dayton Distributor simply put Cog-Belts on the drive. Now the same number of belts carry the increased load—and the dredge's space problem is solved. Whether *your* drive problem is *space, cost,* or *longer life,* it will pay you to look into the advantages of the Dayton Cog-Belt.



FOR REGULAR DRIVES . . . THE DAYTON THOROBRED V-BELT IS TOPS!

The Dayton Thorobred V-Belt is the V-Belt for standard drives. Its patented, three-prime-section design, containing high-tenacity rayon cords, and its durable double wrap, result in exceptionally long life. The Dayton Thorobred V-Belt has set completely new standards for long life and trouble-free service at minimum cost!

*T.M

See "Belting" in the yellow pages of your local telephone directory for the Dayton V-Belt Distributor. Let him solve your drive problems!

Dayton Rubber

Since 1905

World's Largest Manufacturer of V-Belts

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

No pre-layout needed

TO BORE 61 HOLES IN 110" DIA. GAGE RING CENTERS HELD TO ± .0004"

There's one essential thing you must have to save time and money in most metalworking shops — and that's imagination! And Giddings & Lewis Horizontal Boring, Drilling and Milling Machines give your imagination the widest range of machining possibilities with which to work.

Why? Because they're multi-purpose machines with open-type construction. That means you can perform one or several operations on a work-piece in a single setup — accommodate work-pieces large and small . . . simple or complex. What's more, there's a size or type in a working range best suited to your particular shop needs. To find out more, see your nearest Giddings & Lewis representative at once or write direct. Ask about the Giddings & Lewis Job Analysis service . . . and don't forget . . . DELIVERY MAY BE BETTER THAN YOU THINK!

Giddings & Lewis' 5 point "Job Analysis Service" takes the guesswork out of buying heavy machine tools . . . works for you and with you to solve big and complex machining problems . . . increases production . . . reduces machining costs.

1. COMPLETE STUDY OF YOUR JOB OR JOBS—G&L Job Analysis Engineers, working with your engineers completely analyze your machining requirements.

2. DETERMINE MOST EFFICIENT MACHINING METHOD — G&L engineers can give an unbiased opinion because G&L builds a complete line of sizes and types of planers, planer-millers, vertical boring and turning mills and horizontal boring, drilling and milling machines . . . plus a complete line of accessories and tooling for these machines.

3. SELECT THE SIZE, KIND AND TYPE OF MACHINE — Using your production and work requirements, G&L engineers recommend the exact size, kind and type of machine that you need.

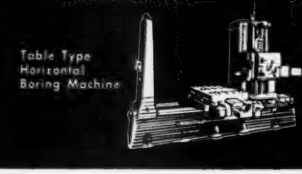
4. PLAN YOUR OPERATIONS—To minimize number of setups and setup-time, use modern cutting tools to best advantage, take full advantage of the working ranges and capacities, keep operator fatigue to a minimum.

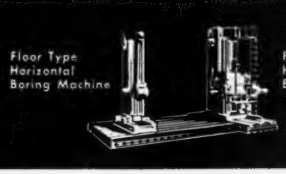
5. RECOMMEND (AND DESIGN IF NECESSARY) THE TOOLS AND ACCESSORIES TO USE — To make your equipment more productive — more versatile in application.

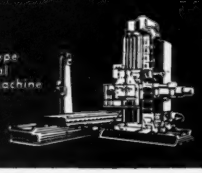
How to get a G&L job analysis

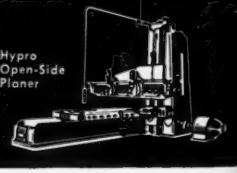
Call your nearest G&L dealer or write us direct. Furnish our Job Analysis Engineers with blueprints, job data and production requirements. Factory engineers will completely analyze your machining problems. There's no charge, no obligation. Don't hesitate — do it today.

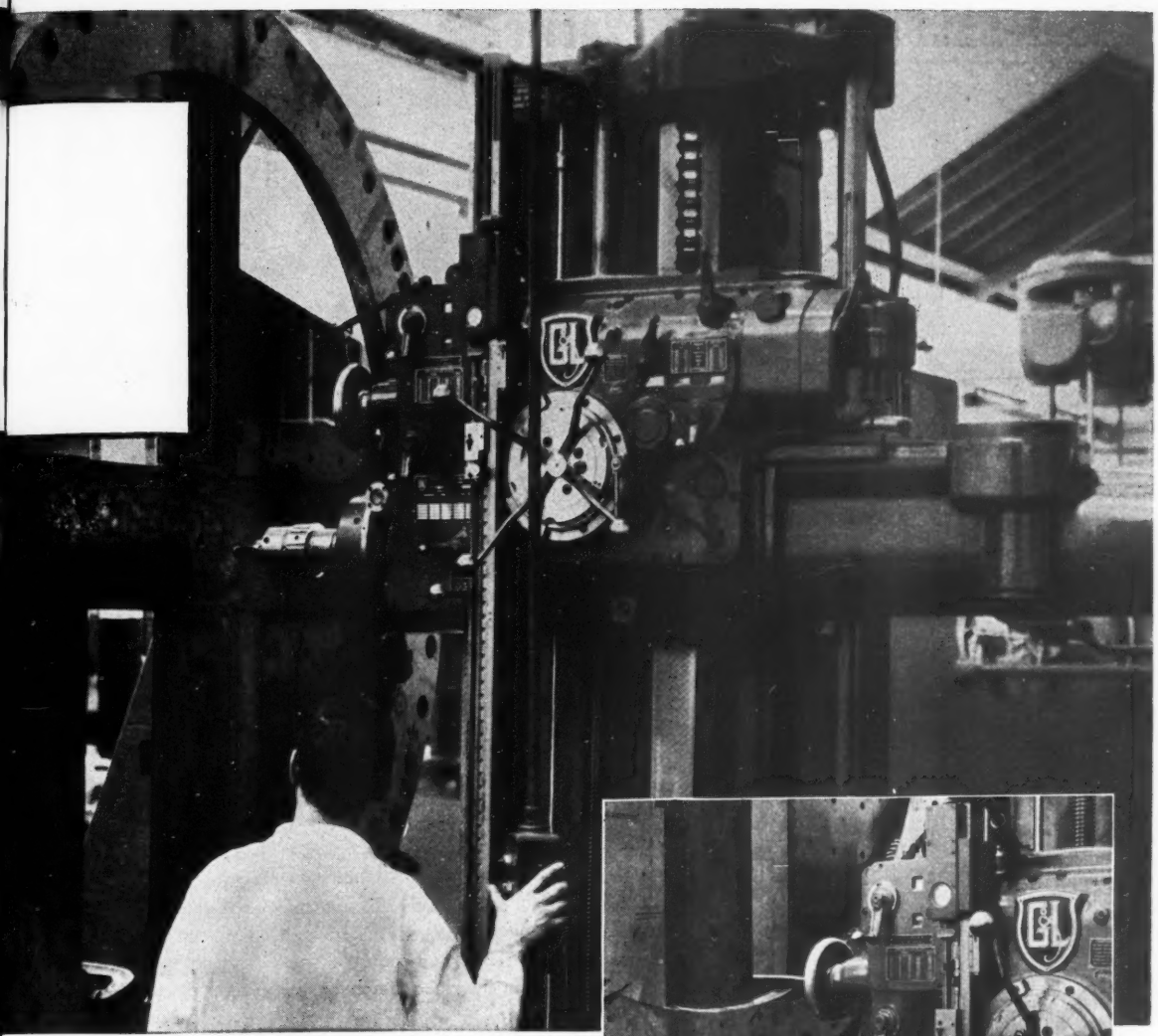
GIDDINGS & LEWIS







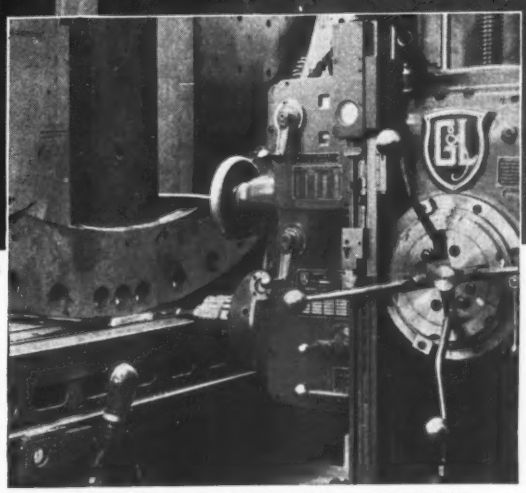




Photos and job data — courtesy The Cross Co., Detroit, Mich.

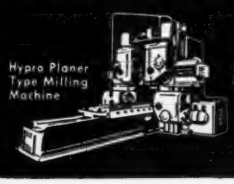
It's on the tough, unusual jobs like this one that Giddings & Lewis Horizontal Boring, Drilling and Milling Machines pay their way many times over.

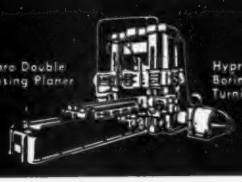
Exclusive automatic positioning is so reliable that no time is lost laying out the job. Open-type construction gives operator plenty of room to make the setup. The operator establishes his original center, then the electric positioning device aligns the headstock and table into proper position for each subsequent bore.



Close-up of electric positioning device — note dial indicators on table and head stock. Precision rods also used.

MACHINE TOOL CO.


Hypro Planer Type Milling Machine


Hypro Double Housing Planer

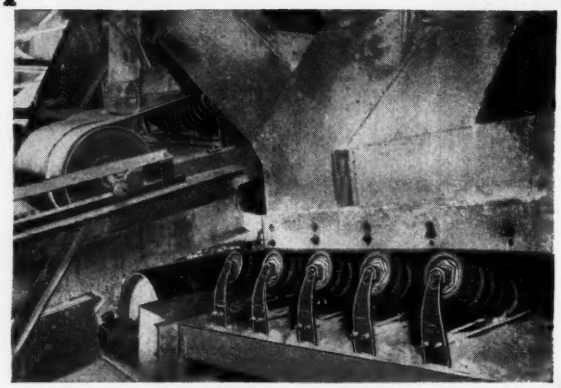
Hypro Vertical Boring and Turning Mill

G&L HYPRO

FOND DU LAC
WISCONSIN

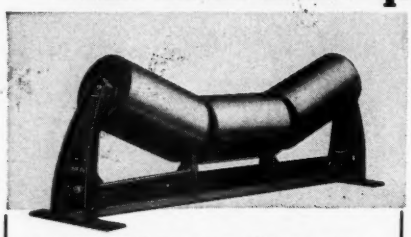
LINK-BELT engineering experience...

GYPSUM ROCK is carried at rate of 500 tph from ship's side to open yard storage by 30-inch Link-Belt Belt Conveyors.

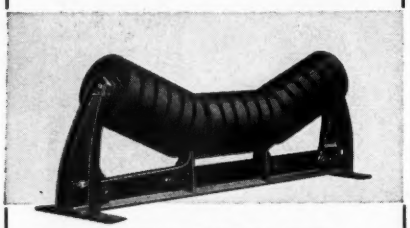


JUNCTION OF Link-Belt Belt Conveyors, showing rubber-tread impact idlers at loading points and welded steel foot pulleys.

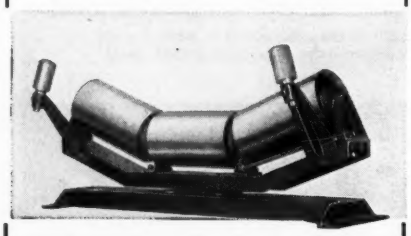
Plus LINK-BELT quality components...



SERIES 100 TROUGHED BELT IDLERS. Strong, balanced integral rolls revolve on high-grade roller bearings, Grease-in, dirt-out seal, large reservoir preserve lubricant.



RUBBER-TREAD IMPACT IDLER for loading points protects the belt by absorbing the shock of heavy materials or lumps delivered from above.



BELT-TRAINING IDLER for automatic belt positioning. The actuating rolls respond to slightest contact — quickly recede and center the belt to minimize wear.

...add up to your best bet in

BELT CONVEYORS

WHAT'S your materials handling problem? Tonnage, distance or a combination of the two? Heavy or light materials? Large lumps or fines? Continuous or intermittent operation?

Whatever the conditions, you'll find the right answers at Link-Belt. For Link-Belt designs conveyor systems to meet your requirements. Backed by unmatched materials handling and power transmission experience, our conveyor specialists help you and your consultants get the right equipment in the right place.

One Source—One Responsibility

Link-Belt makes all the various elements — all types and sizes of idlers, takeups, pulleys, trippers, bearings and power transmission drives. Plus all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers.

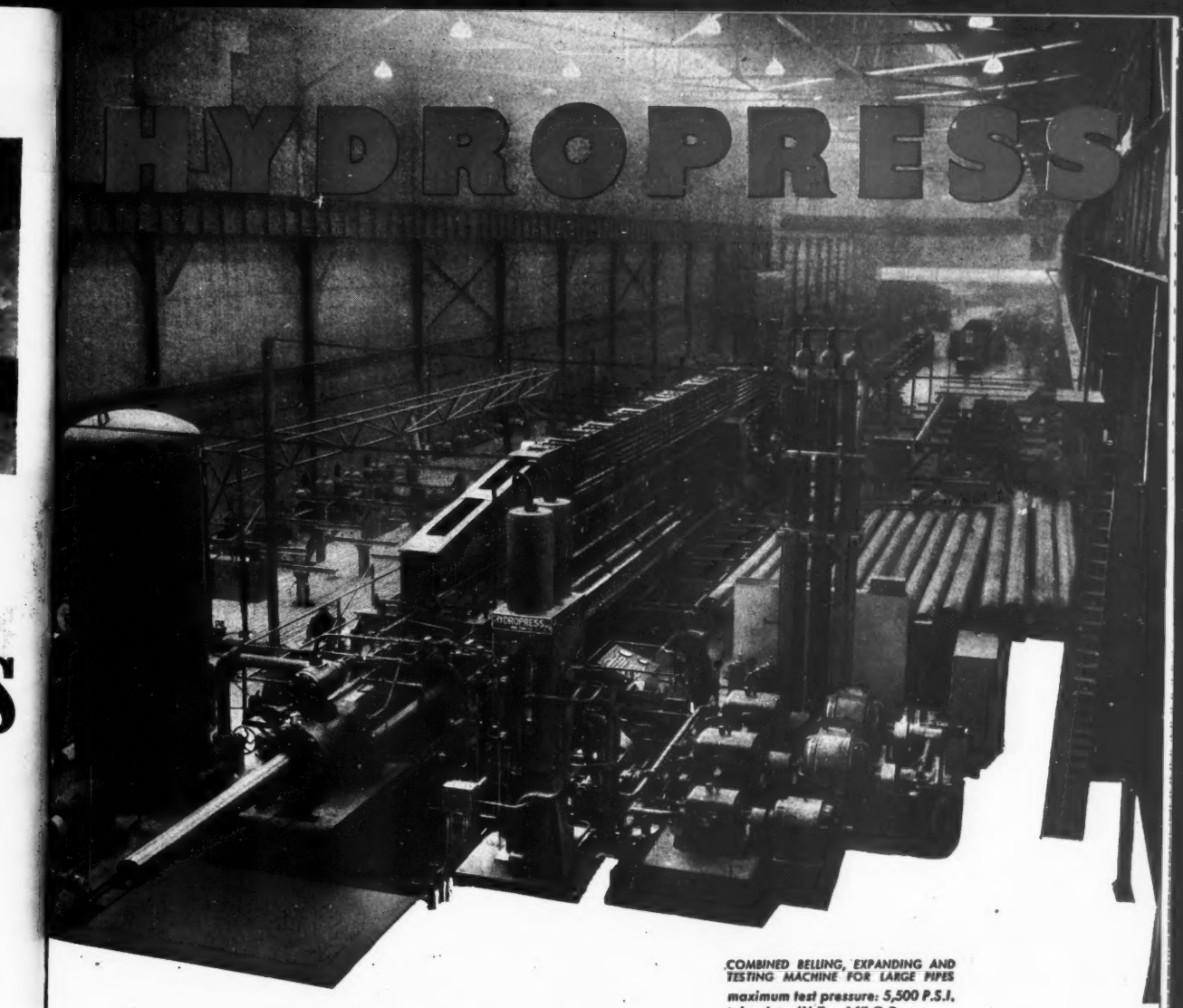
And Link-Belt will build your supporting structures and enclosures. . . . install the job completely. One source — one responsibility. Every detail receives the proper attention to assure you an efficient, trouble-free, long-life conveying system.

The next time you need belt conveyor engineering assistance, call the Link-Belt specialist in our office near you.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,800



COMBINED BELLING, EXPANDING AND TESTING MACHINE FOR LARGE PIPES
maximum test pressure: 5,500 P.S.I.
tube size: 4½" — 16" O.D.
tube length: 17' — 51'
supplied to
Page-Hersey Tubes, Ltd.
Welland, Ont.

HYDRAULIC PIPE TESTING MACHINES

For Combined Belling, Expanding and Testing on High Production Basis

Belling of both pipe ends, expanding of full length against a closed mantle, and hydrostatic test are performed in one semi-automatic operation.

HYDROPRESS INC.
ENGINEERS • CONTRACTORS

HYDRAULIC PRESSES • ACCUMULATORS • PUMPS • ROLLING MILLS • DIE CASTING MACHINES

566 LEXINGTON AVENUE at 51st Street NEW YORK 22, N. Y.

CHICAGO
DETROIT
SAN FRANCISCO
SEATTLE
WASHINGTON, D. C.

NIAGARA

The performance of Niagara Knives is the result of long experience in manufacturing not only knives but the shears upon which they are used. Niagara Knives are made in the Niagara Plant with every step including design, metallurgical specifications, heat treating, grinding and inspection under Niagara control. They are made in single and four cutting edge solid steel, laid steel and high speed types. Alloys and heat treat characteristics to suit every shearing need.

NIAGARA FACTORY REGRINDING SERVICE

Take advantage of Niagara factory regrinding service by the same skilled men and on the same precision machines used in making Niagara Knives.

Each Niagara Knife is reground in accordance with its own metallurgical and heat treat characteristics as recorded by serial number at the factory.

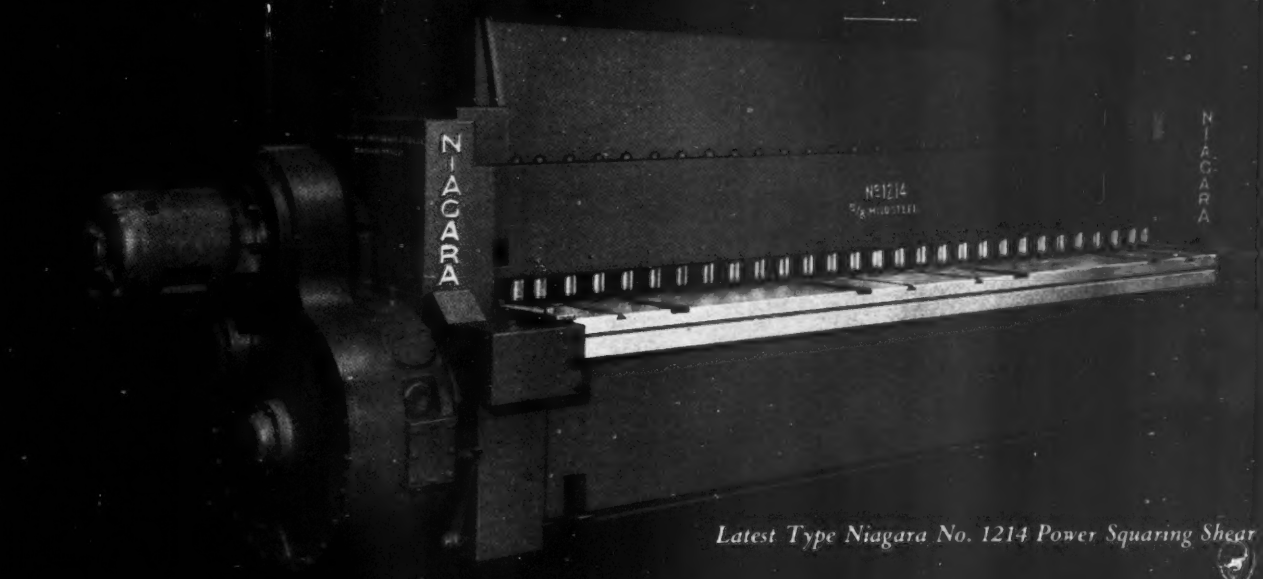
Prolong the life of your knives by having them reground by Niagara factory methods rather than by improvised methods.

NIAGARA MACHINE AND TOOL WORKS · BUFFALO 11, N. Y.

KNIVES

MADE BY THE MANUFACTURERS *of* POWER SQUARING SHEARS

Manufacturers of America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work



Latest Type Niagara No. 1214 Power Squaring Shear

DISTRICT OFFICES: NEW YORK, CLEVELAND, DETROIT

STANORUST

REG. U.S. PAT. OFF.

Rust Preventives

Prevents rusting of piston pins

● Piston pins and other automotive parts stored in the plant and on the customers' shelves frequently rusted and had to be discarded, presenting a real problem for Chefford Master Mfg. Co., Inc., Fairfield, Illinois. The loss of inventory and the extra handling were expensive.

Taking their cue from the successful job being done by STANORUST Rust Preventive 4-V on temporary storage, the manufacturers tested STANORUST 3-X for the extended storage job, as recommended by a Standard Oil lubrication specialist. STANORUST 3-X passed the test. In the words of John Bodner of Chefford Master Mfg. Co., Inc., "... with no wrapping and little or no cleaning necessary to prepare the parts for use."

One of eight grades in the STANORUST Rust Preventive line, STANORUST 3-X provided the combination of protection, ease of application (dipping), and freedom from discoloration that this job called for. One of these eight grades is certain to provide the answer to your own rust prevention problem. For details, contact the Standard Oil Company office nearest you, or write: Standard Oil Company, 910 South Michigan Ave., Chicago 80, Illinois.

What's YOUR problem?

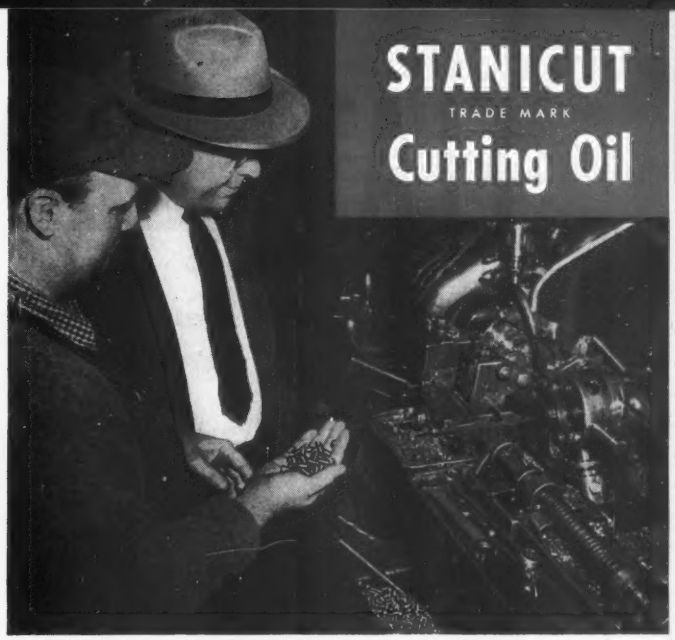
R. E. Murnahan, working out of Standard's Evansville office, is the lubrication specialist who helped this customer use STANORUST 3-X to solve a particular rust prevention problem.

Located throughout the Midwest is a corps of specially trained, experienced lubrication specialists, ready to give you prompt, on-the-spot help with your own lubrication problem. Their broad background of practical experience plus their thorough schooling in Standard Oil Lubrication Engineering classes, is yours for the asking. Simply phone your nearest Standard Oil Company office. Your lubrication specialist will call without delay.

STANDARD

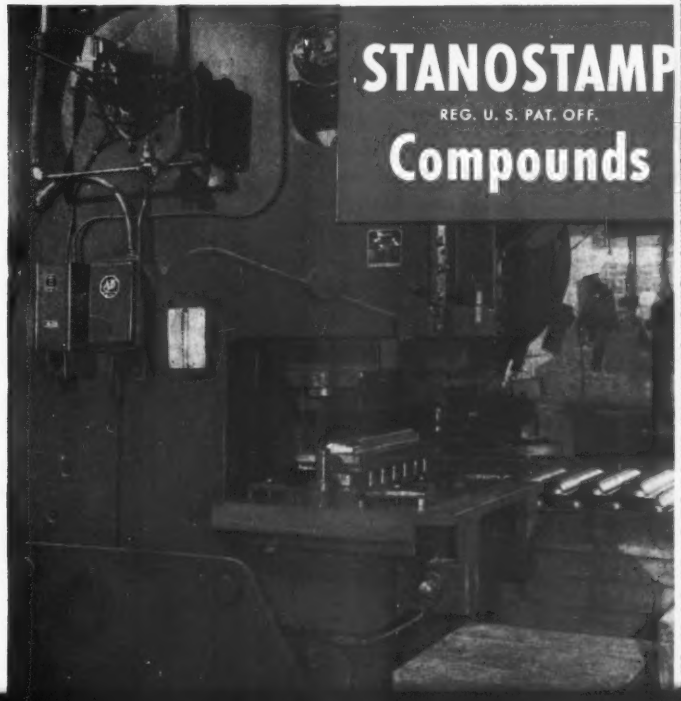
STANDARD OIL COMPANY

(INDIANA)



"WHY USE TWO WHEN ONE WILL DO?" When STANICUT Cutting Oils are considered, chances are that one of the eight grades available will handle a variety of jobs in your screw machine department. Each grade contains the correct proportions of extreme-pressure and friction-reducing compounds to give better finishes and long tool life, more important than ever in the face of tougher production schedules.

FOR MAXIMUM PROTECTION for both dies and work in your own pressroom, ask your Standard Oil lubrication specialist about STANOSTAMP Compounds. Three grades are available to cover a wide range of stamping and heavy drawing work on low carbon or alloy steel. While the compounds are water soluble for economy's sake, all ingredients remain in complete suspension. STANOSTAMP Compounds are easily removed in conventional washing equipment.



FLAT SPRING STEEL

You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 701 ST. CLAIR AVE, N. E. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1920 E. 2ND ST • PHILADELPHIA, 230 VINE ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, N. J.

a gold mine of useful information YOURS FOR THE ASKING!

Chain Belt product literature is designed especially with you in mind. Informative, concise, easy to read, these bulletins contain the information that's bound to be helpful to you in solving your problems in connection with power transmission, conveying and process equipment.

Look over the list below. It contains the most popular items in our current literature list. Surely, several of them are of interest to you. Just check the numbers on the coupon corresponding to the numbers of the ones you want and mail it in. You'll receive your literature promptly.

1 **CARE AND MAINTENANCE OF CHAINS**—Suggestions on how to get better service with less maintenance from your conveyor and drive chains.

2 **REX® LUMBER MILL CHAINS**—Complete descriptions with photos of all Rex Chains used in the lumber, pulp, and paper industries.

3 **REX STOCK SPROCKETS**—Rex Sprockets, carried in warehouse stock for over-the-counter sale, cataloged by chain type and size.

4 **REX TABLETOP® CHAINS**—The story of TableTop, the ideal chain for smooth, steady, tip-free conveying of containers and small parts.

5 **REX Z-METAL CHAINS**—A description of Rex Chains cast of Rex Z-Metal . . . approximately 25% stronger than highest quality malleable iron.

6 **REX CHAINS FOR CEMENT AND ROCK INDUSTRIES**—A complete description of products used in these important industries. Includes chain, idlers, conveyors, bucket elevators.

7 **REX AND BALDWIN-REX CONVEYOR CHAINS AND ATTACHMENTS**—Describes and illustrates various types of conveyors that can be constructed from our complete line.

8 **REX BELT CONVEYOR IDLERS**—Complete descriptions of all types of Rex Belt Conveyor Idlers, including information on proper application.

9 **REX SANITATION AND INDUSTRIAL TRADE WASTE TREATMENT EQUIPMENT**—The story on . . . Sludge Removers, Grit Collectors, Bar Screens, Triturators, etc.

10 **REX TRAVELING WATER SCREENS**—Positive protection for power plants, paper mills, water treatment, chemical and industrial plants with Rex Traveling Water Screens.

11 **REX SPRAY NOZZLES**—Sharp knives of water for washing, cooling, cleaning, and descaling throughout industry.

12 **REX FOOD PROCESSING EQUIPMENT**—Detailed data on the Rex Thermo-Rete® Can Cooler and the Rex Deaerator.

13 **REX ROTO-BRUSH CAN CLEANER AND DRIER**—Describing a new and efficient method for fast washing and drying of most sizes of cylindrical cans.

14 **BALDWIN-REX "BA" RIVETED ROLLER CHAIN**—Describes new riveted roller chain assembly with single pin connector for greater ease of assembly and disassembly.

15 **BALDWIN-REX DOUBLE-PITCH ROLLER CHAIN**—Facts on how you can cut costs and reduce weight by specifying Baldwin-Rex Double Pitch Roller Chain.

16 **BALDWIN-REX FLEXIBLE COUPLINGS**—Illustrates and describes the five types of Baldwin-Rex Roller Chain Flexible Couplings.

17 **BALDWIN-REX STOCK ROLLER CHAINS**—Complete specifications, prices and descriptions of Baldwin-Rex Roller Chains, Couplings, Sprockets.

18 **UNUSUAL APPLICATION OF ROLLER CHAIN**—28 pages of photos, blueprints and stories showing unusual, money-saving uses of Baldwin-Rex® roller chain.

19 **BALDWIN-REX TENSION LINKAGES**—Leaf chain and roller chain in tension linkage applications on hoists, lift trucks, controls. Of special interest to machine designers.

20 **A QUICK LOOK AT CHAIN BELT**—The story of Chain Belt Company in capsule form . . . with plenty of pictures showing history and product application.

Chain Belt COMPANY
OF MILWAUKEE

REX
BALDWIN-REX®

Sales Offices or Distributors in principal cities in the United States and throughout the world.

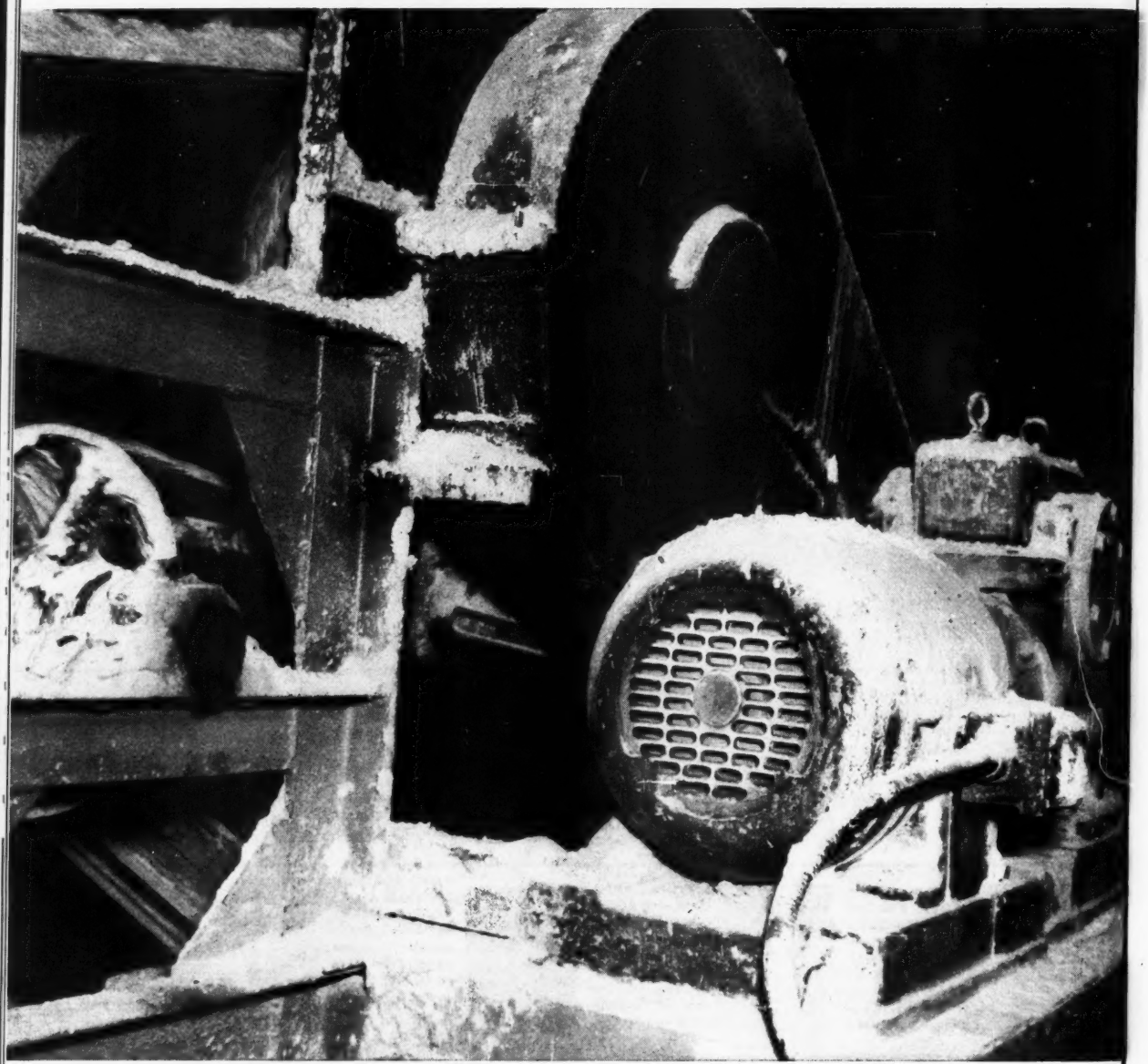
Chain Belt Company, Advertising Dept. 52-400A
4660 W. Greenfield Ave., Milwaukee 1, Wisconsin
Please send me literature checked below.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7
☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14
☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 19 ☐ 20

☐ I would like to have a Rex Field Sales engineer call.

Name.....
Company.....Dept.....
Street.....
City.....State.....

INDUSTRY DOES THE



THE CHEMICAL INDUSTRY depends on standard, "off the shelf," Tri-Clad motors in the most adverse operating conditions, including corrosive, abrasive and explosive atmospheres. The 7½-hp totally-enclosed fan-cooled Tri-Clad motor above drives a crude ash conveyor an average of over 23 hours every day.

GENERAL ELECTRIC

752-12

TOUGH JOBS WITH TRI/CLAD MOTORS

REG. U.S. PAT. OFF.

EXTRA PROTECTION

Every Tri-Clad motor, open or totally-enclosed, is triply-protected against *physical damage, electrical breakdown* and *operating wear and tear.*

That's why you'll find general-purpose Tri-Clad motors in every industry—not only on the usual jobs which they do so economically—but on the *tough* jobs where unfailing performance is a must.

PROMPT DELIVERY

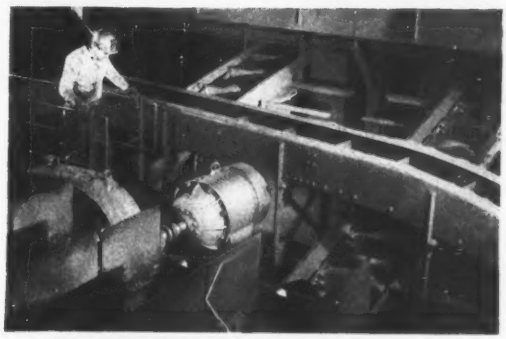
Today especially, delivery and service are important. G-E shipping points all over the country are ready to deliver most standard ratings right out of stock. And with the most complete service shop network in the motor industry you are assured of the best attention to motor problems.

TIMELY INFORMATION AVAILABLE

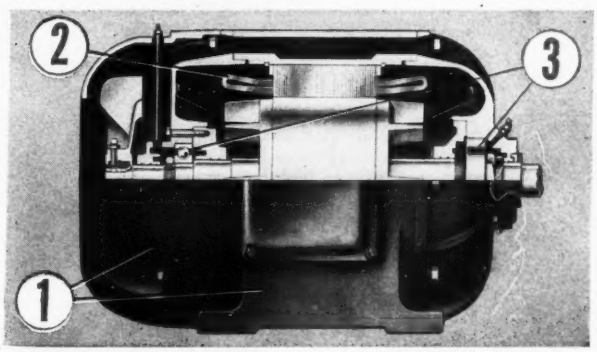
If you are concerned with training manpower, the new G-E Motor Selection and Application Course, including nine strip films, is a unique and valuable aid. A sample copy of the "Instructor's Manual" (GEZ-310), which outlines the course, may be obtained on request.

Also available is a free bulletin on "How to Maintain Motors and Generators" (GET-1202). Contact your local G-E sales office for any of the above material, or write *Section 752-12, General Electric Co., Schenectady 5, N. Y.*

FOOD PLANTS on "continuous process" operation depend on Tri-Clad motors to avoid costly shut-downs. Totally-enclosed, non-ventilated Tri-Clad gear-motor above drives a repulper in a sugar refinery.

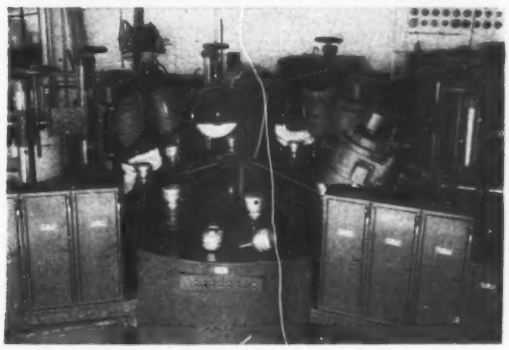


MINING INDUSTRIES know Tri-Clad motors can take abuse, don't twist out of line and are corrosion-resistant. This totally-enclosed, fan-cooled, Tri-Clad motor runs a coal conveyor.

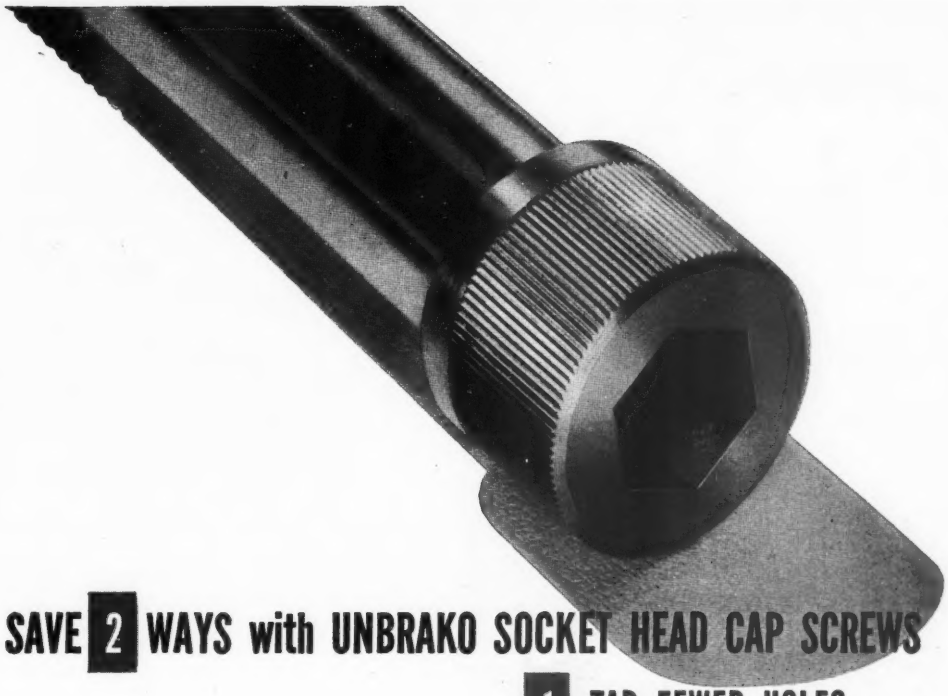


UNINTERRUPTED SERVICE under tough conditions is assured by many outstanding features of Tri-Clad totally-enclosed motors, for example: 1 rigid, cast-iron end shields and frame; 2 Formex* windings which resist oil, heat, shock, moisture, abrasion; 3 completely enclosed bearings that will last longer because provision is made for relubrication if necessary.

Reg. trademark of General Electric Co.



METAL WORKING FIELD likes Tri-Clad motors because they're easy to mount in any position, rigid and smooth running, and *can be relubricated if operating conditions warrant—without disassembly!* Six 7½-hp TEFC Tri-Clad motors run machine above which polishes 500 to 1000 metal coffee-makers per hour!



SAVE 2 WAYS with UNBRAKO SOCKET HEAD CAP SCREWS

1 TAP FEWER HOLES

It costs money to tap holes. You have to lay out, center punch, center drill, tap drill, body drill, counterbore, tap the hole, and insert the screw. The fewer holes you tap, the less the cost. *Three UNBRAKO screws will do the same job as five ordinary cap screws.*

2 USE SMALLER DIAMETER FASTENERS

Since a ⅜" UNBRAKO Socket Head Cap Screw is as strong as an ordinary carbon steel screw of ½" diameter, you save in weight and cost by using UNBRAKO. And because smaller diameter screws require less space, they permit more compact designs.

When designing, it pays to save with UNBRAKO! Write for descriptive literature. STANDARD PRESSED STEEL Co., Jenkintown 33, Pennsylvania.

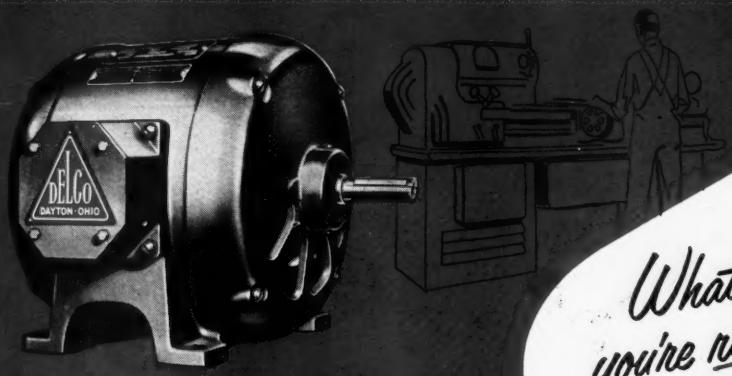
UNBRAKO® SOCKET SCREW DIVISION

See us at the A.S.T.E. 20th Annual Convention, International Amphitheater, Chicago, Illinois, March 17 to 21, 1952.

SPS

JENKINTOWN PENNSYLVANIA

CAP SCREWS • SET SCREWS • SHOULDER SCREWS • DOWEL PINS • PRESSURE PLUGS



OPEN BALL-BEARING MOTOR

Whatever the job you're right with a DELCO!

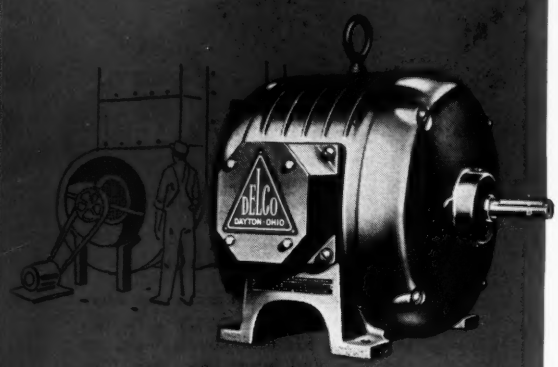
Whether you need totally enclosed or open-end motors . . . fan cooled or explosion-resistant motors . . . you're certain to get the right motors on the job when you choose Delco.

Each and every Delco motor is designed and built for the job it has to do. It's *made* of the finest materials, and *engineered* to stand up longer under the roughest conditions.

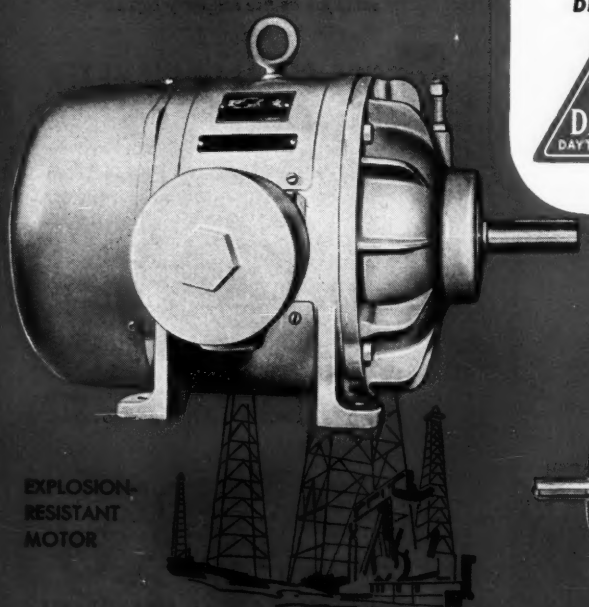
So check up on Delco motors, now. You'll find Delco has the motors you need, and that Delco always meets its commitments. For full details, write to Delco Products, Dayton, Ohio, or call the nearest sales office listed below.

DELCO FEATURES MAKE DELCO FINEST

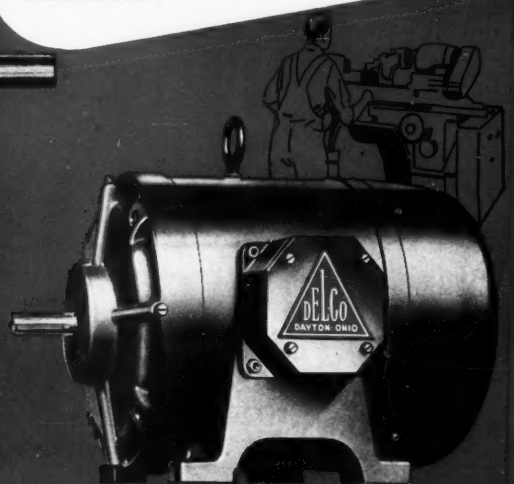
DELCO PRODUCTS
Division of General Motors Corporation
Dayton, Ohio



TOTALLY ENCLOSED, NOT FAN COOLED MOTOR

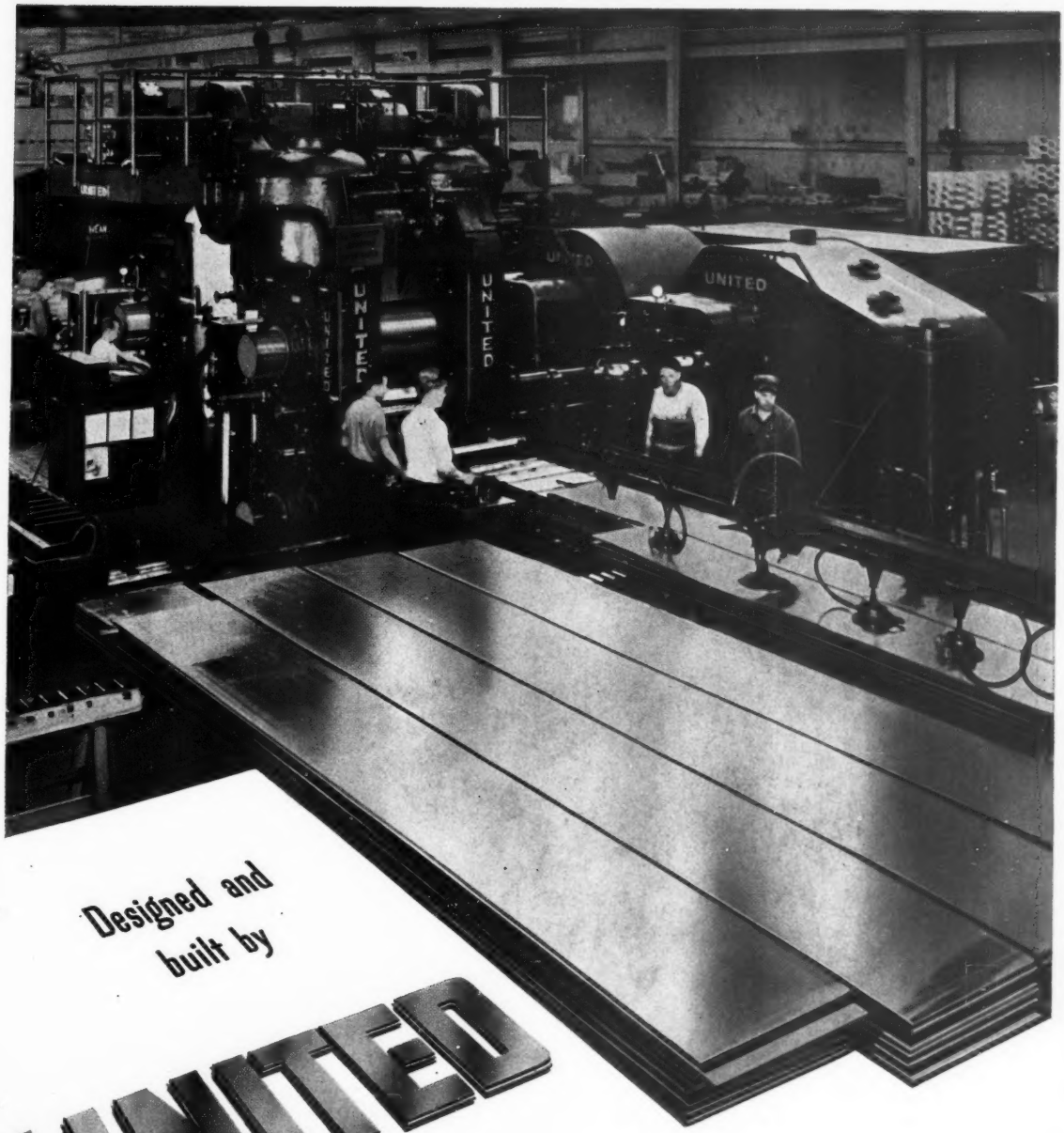


EXPLOSION-RESISTANT MOTOR



TOTALLY ENCLOSED, FAN COOLED MOTOR

SALES OFFICES: ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DETROIT • HARTFORD • PHILADELPHIA • SAN FRANCISCO • ST. LOUIS



Designed and built by

UNITED

4-HIGH 2-STAND TANDEM BRASS MILL

UNITED

ENGINEERING AND FOUNDRY COMPANY

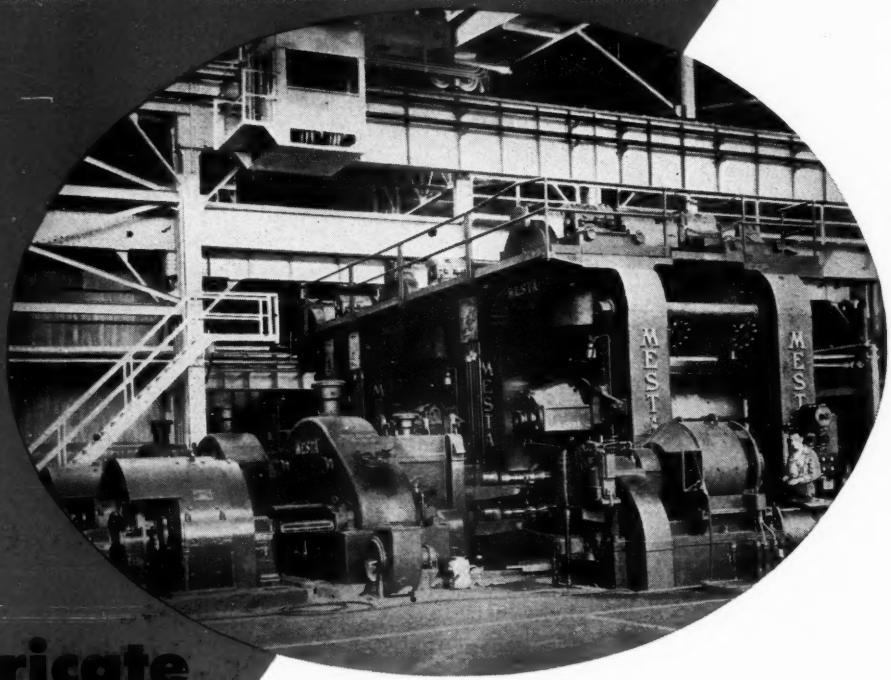
PITTSBURGH, PENNSYLVANIA

Plants at: PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
LOBDELL UNITED COMPANY, WILMINGTON, DELAWARE
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

Give your Oil Film Roll Necks EXTRA PROTECTION



...lubricate with TEXACO REGAL OIL

With *Texaco Regal Oil* in the circulating system, your back-up roll necks will roll on a super-tough lubricating film designed to carry heavy loads under all operating conditions. Thus you'll get smoother operation, longer bearing life, lower maintenance costs.

There is a complete line of *Texaco Regal Oils*—all turbine-quality for bearings in heavy-duty service. Because of their high resistance to oxidation, emulsification and sludging, *Texaco Regal Oils* keep circulating systems clean, assure a constant flow of cooling lubricant to maintain normal bearing temperatures.

In your enclosed reduction gears, use *Texaco Meropa Lubricant*. It resists oxidation, will not foam . . . assures longer gear life and lower maintenance costs.

Let a Texaco Lubrication Engineer work with you to raise efficiency and lower costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Regal Oils
(HEAVY CIRCULATING OILS)

Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

The Metalworking Outlook

February 25, 1952

Union Shop: Ominous Turn

Ominous signs that the Administration wants to have the union shop as part of its national labor policy—a Presidential Rail Emergency Board recommends it and the WSB favors it—will have little direct bearing on the steel wage case. But the union shop may figure in the way the steel formula filters down to other industries. A union shop—requiring compulsory union membership—could speed WSB's job of ruling on the hundreds of cases that are bound to come before it when the steel case is settled. WSB could swing the pendulum toward that union objective by ruling first on those clearer-cut cases where companies have what in effect is a union shop. Companies with the more complex problems that often arise in an open shop will be penalized. To avoid that penalty, some may reluctantly come to accept the closed shop.

What's Ahead in Productivity?

Resign yourself to a moderate dip in labor productivity over coming months. That usually occurs in times of labor ferment. For the long term, productivity has not changed markedly since the Korean War began. A National Industrial Conference Board survey shows that more than half of 137 companies surveyed had little or no change. Some 25 per cent report increases as high as 38 per cent. The remainder reveal declines of as much as 12 per cent.

More Distribution Changes

Expect more changes in the distribution of oil country tubular goods. Complaints about the present setup are loud and the House Small Business Committee's Subcommittee No. 3 will hear the latest Feb. 27 and 28. To forestall some of the trouble, Petroleum Administration for Defense last week hurried through three changes: Conversion steel will from now on be handled separately for applications of and allotments of pipe; rules on set-aside field stocks for small operators are modified; deadline rules for applications of pipe are relaxed.

Just a Matter of Timing

Despite publicity given to cancellations of some defense production programs, such cancellations are not widespread. The significant changes in defense scheduling concern timing. What we once thought would be produced in 1952-53 will now come about one year later. Except for the lengthening out in time schedules, most defense programs will be about the same in total output contemplated and dollar expenditures.

More for Small Business

Small business is now getting about one-fourth of the defense procurement dollar, and the ratio is rising. Room for improvement

Production-Engineering News—p. 75 *The Market Outlook—p. 133*

exists. Of all the defense work considered suitable for small business by the Navy's Bureau of Ships from July through November last year, some 68 per cent actually went to such firms.

Battle of Giants

A battle takes shape between U.S. Steel Corp. and Bethlehem Steel Co. for eastern steel markets from just below Philadelphia to northern New England. And it won't hurt you steel buyers one bit. U.S. Steel's new Fairless works will be in direct competition in that region with Bethlehem's Sparrows Point and other facilities. Already both companies are improving distribution points throughout the area and making new market studies. The toughest fight will center in Philadelphia and northern New Jersey.

Drop Forgers Have Troubles

Drop forgers need more hot-rolled carbon bars and billets. Inadequate allocations of those products, an industry advisory committee told NPA, was one of the reasons why it operated at only 54 per cent of its capacity in January. Drop forgers have the theoretical capacity to produce 300,000 tons of forgings a month.

The Schools Win

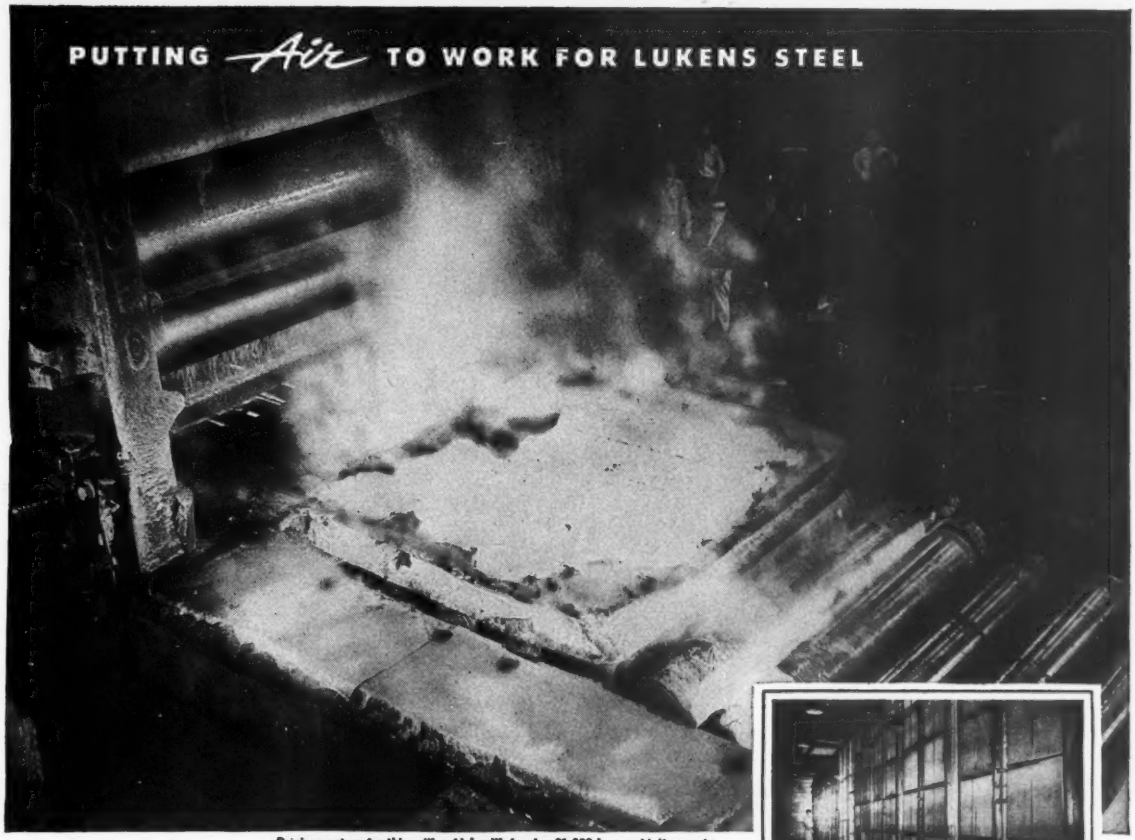
More than 1500 new elementary and secondary school projects will get under way in the second quarter. That's triple the number of new projects originally considered possible by NPA. The increase results from strict metal conservation in designing the projects and more liberal allocations of controlled materials. Second-quarter allocations also will permit the continuation of more than 2000 school projects already in progress.

Straws in the Wind

Fast write-offs given to 118 electric utility projects to date will add 8 million kilowatts to power supply; cost is $1.2 billion . . . Design of the first atom-powered plane is taking shape at Consolidated Vultee's San Diego plant . . . Kaiser Aluminum & Chemical is building a fluorspar processing mill in Nevada . . . By buying Brush Development Co., Cleveland Graphite Bronze not only acquired a top-notch research department but gained a foothold in the electronics and beryllium fields . . . Prodding by Canada will bring a decision on the St. Lawrence Seaway soon.

What Industry Is Doing

Decontrol timetable takes shape (p. 47) . . . No shortage of cold-rolled strip, says Cold Metal Products Co. (p. 48) . . . Effects of a steel wage settlement will be felt by small companies, too (p. 49) . . . Carboloy finds getting back into production is no small task (p. 49) . . . Walter Reuther sounds the UAW trumpet for an annual wage (p. 50) . . . Erie Mining wants to build a commercial taconite plant in Minnesota (p. 51) . . . Tool and die shops are blossoming on the West Coast (p. 58) . . . Steel distribution pattern shifts (p. 59).



Driving motors for this mill, which will develop 21,000 hp, couldn't operate for long without costly maintenance if they didn't "breathe" clean air

ELECTRONS SCRUB THE AIR FOR BIGGEST PLATE MILL

Over in Coatesville, Pa., Lukens Steel Company operates the biggest steel plate rolling mill in the country. This behemoth swallows 55-ton ingots and spews them out as plates up to 195 inches wide. Electrical equipment driving the rolls is as big and tough as the job demands. Yet dirt particles so small you can't see them can bring the whole operation to a standstill.

How? Minute airborne particles build up on windings—cause overheating, fire or electrical failure. Answer? Westinghouse PRECIPITRON® for electronically cleaning the motor ventilation air. This electronic air cleaner takes over where other air cleaning devices give up. It is so efficient it traps even the microscopic particles that make up smoke.

This efficient electronic air cleaner—PRECIPITRON—has meant remarkable operational savings in many ways to industrial plants, commercial buildings, laboratories—even homes. You'll find it worthwhile to see if Westinghouse can help you *put air to work*, too—with air cleaning, air conditioning or air handling. Call your local Sturtevant office, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

These PRECIPITRON units clean 200,000 cfm of ventilating air for Lukens' mill motor and control room.

Six AXIFLO® Fans develop steady pressure to draw air through PRECIPITRON, force it into motor room.

Five SILENTVANE® Fans draw the cleaned air through mill motors and generators to cool them.

YOU CAN BE SURE...IF IT'S

Westinghouse

J-80239

HOW TO KEEP "STAINLESS" IN YOUR PRODUCTS

This sink strainer is an excellent example of Armco 17 coming to the rescue when 18-8 went under government restrictions. The other familiar parts shown are also of Armco 17. They illustrate uses and drawing operations well suited for this grade.

Wash Basin

Automobile Gravel Guard

Drinking Fountain Top

Mess Tray for Armed Forces

Armco 17, Type 430 chromium stainless steel is available as an "alternate" for many jobs in which the use of 18-8 is restricted by NPA Order M-80. This government regulation affects only the nickel-bearing stainless steels such as Armco 18-8, Type 302.

Non-nickel-bearing Armco 17, with 14 to 18 per cent chromium, is one of the oldest standard stainless steel types. It is not likely to be as satisfactory as 18-8 for most equipment used in food processing, meat packing, dairies, textile wet-processing, or the manufacture of pulp. But Armco 17 has given an excellent account of itself in products not subject to unusually severe corrosive conditions. It is also suitable for heat-resisting uses up to about 1550° F. Type 430 has long been used for automotive trim and other decorative applications on refrigerators, ranges and washing machines.

Armco 17 sheets, strip and plates come in the same gages, sizes and finishes as 18-8, and there is a full range of bars and wire.

Forming characteristics are about the same as hot-rolled steel but welds are less ductile and less resistant to severe shock loading. With modifications in drawing practice, Armco 17 will take difficult deep-drawing operations. Bars and wire are readily machinable at higher speeds than 18-8.

Your Armco Distributor has Type 430 sheets in stock. He will be glad to supply you with technical information and fabricating data bulletins. If you do not know his name, write us at the address listed below.

ARMCO STEEL CORPORATION

1342 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

Point Four

In envisioning his Point Four program as a war against man's ancient enemies—poverty, disease, hunger and illiteracy—President Truman is on sound ground. If the work proposed to be done in Asia, Africa and Latin America is carried out intelligently, the benefits could easily offset the costs by a large margin.

Raising the standards of living in backward areas would facilitate a freer flow of critical materials such as manganese ore, tin, lead, copper, cobalt and oil to industrial nations. Eventually it would create new markets for manufactured products. The potential benefits of Point Four are undeniably attractive.

Some people scoff at Point Four because they fear it will become another vehicle for unrestrained spending. They have solid reasons for this fear. Time and time again our government has thrown away hundreds of millions because misguided "do gooders" have thought that money can do what only education, patience and sympathetic understanding can do.

Guidance for the approach to Point Four should come from persons who have had valuable experience in the field. Long before the term Point Four was coined, American agricultural missionaries were learning what it takes to induce a poverty, disease stricken native to change his ways. The State Department recently outlined stories of the pioneering of Frank Pinder in Liberia, Albion Patterson in Paraguay and Horace Holmes in India.

Although they operated in widely separated areas, there was a significant similarity in the tactics they employed. They lived with natives, won their confidence and learned why they resist progress. Usually the deplorable state of the people is due to ignorance, tradition or religion. In India Horace Holmes had to invoke the aid of a respected religious leader to persuade farmers that plowing under green legumes was permissible under their code. In Paraguay Albion Patterson had to overcome tribal traditions and in Liberia Frank Pinder found ways to break down superstitions.

Lavish outpouring of money is not the answer. Nor would the advance of officious bureaucrats into the wilderness do any good. Humble, understanding people, working in the difficult role of economic missionaries must be the advance guard of Point Four.

E. L. Shaner

EDITOR-IN-CHIEF

TWO-WAY DISTORTION: Years ago the money in a pay envelope had a definite meaning. To the employee it represented his true earnings. To the employer it was the cost of the man's work. Today the amount in the envelope is fantastically unrealistic. It does not represent earnings or cost.

This distortion is bad in two ways. The employee thinks in terms of "take home" pay. He ignores the amount deducted for income tax,

social security and other payments. He probably doesn't even think about the portion of the deductions that came out of the employer's pocket.

From habit, the employer thinks in terms of straight time wage rates. He is just beginning to realize that the real cost of an hour's work is not only the straight time rate but also the extra charges for overtime, holidays, shift premiums, vacations, pensions, insurance, welfare funds, old age and unemployment benefits, workman's compensation, accidents, hospitalization, reporting time or other allowances.

In 1951 these "fringe" costs for United States Steel employees amounted to 37 cents per hour. This is 21 per cent of the straight time rate. We must learn to be more realistic about the earnings of labor and the cost of labor.

* * *

THE SAGA OF BATTELLE: To our desk last week came an attractive booklet from Battelle Memorial Institute. By means of well written text and excellent illustrations it gives the reader an impressive picture of the institute's facilities for research. At the same time, it tells the exciting story of the rapid growth of Battelle's service.

Founded as a nonprofit corporation by the will of Gordon Battelle as a memorial to a pioneering Ohio industrial family, the institute began operations in 1929 with a staff of 20 people. It spent the succeeding five years developing its research-for-industry plan. At the end of this period, its sponsored research amounted to $80,000. Since then it has gained in every year. In 1951, Battelle research was at the annual rate of $9 million. The institute's staff now numbers 1600. Its 12 acres of laboratories are used by 38 research divisions. The list of companies that have sponsored research at Battelle reads like the blue book of American industry.

Battelle's noteworthy achievements reflect great credit upon Director Clyde Williams and his associates.

* * *

41% GOES TO OTHERS: Bendix Aviation Corp. is in a rather unusual position in that about 80 per cent of its sales in 1952 will be for the defense program. Because of this high percentage, the distribution of money received on defense contracts becomes important. In the annual report of Bendix it is revealed that 41 per cent of income from defense orders goes to suppliers and subcontractors and that of this 41 per cent, going to 6000 subcontractors and suppliers, about 55 per cent will be distributed to companies classified as "small business." Bendix has 355 subcontractors within 300 miles of its South Bend, Ind., plants.

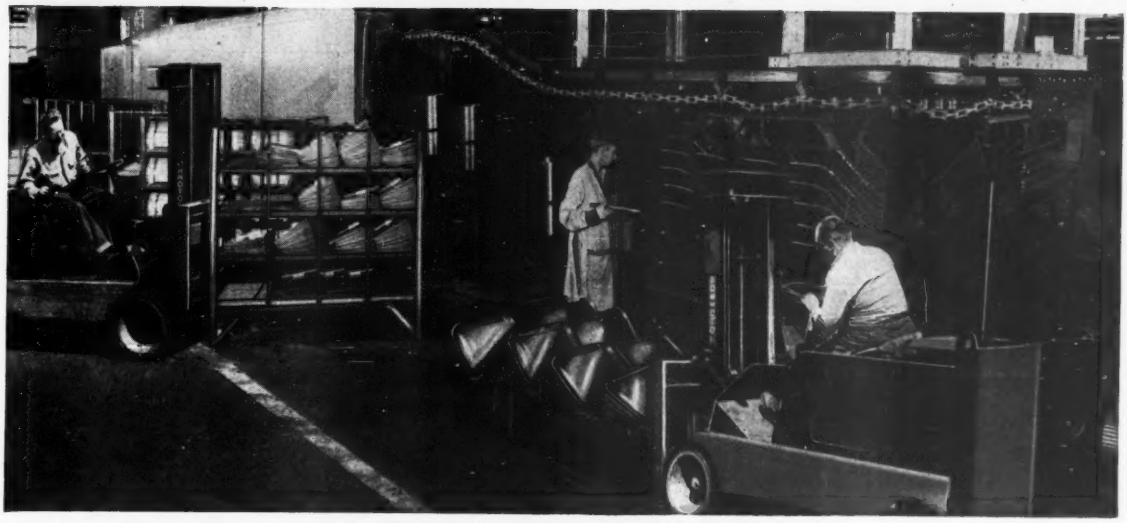
* * *

200 BILLION TON-MILES: Several months ago R. E. Zimmerman, vice president of United States Steel, presented basic facts regarding the iron and steel industry to the Industrial College of the Armed Forces. Included in his remarks was a statement of the amount of transportation that is required to supply American steelmaking activity. He estimated that a minimum of 200 billion ton-miles of transportation is involved annually. This is a startling figure, especially if one tries to envision what it means in terms of trips of lake and ocean freighters, railroad cars, inland waterway barges and highway vehicles. Although the present rate of steelmaking taxes all forms of transportation severely, we enjoy infinitely better transportation services than are provided in any other large industrial nation.

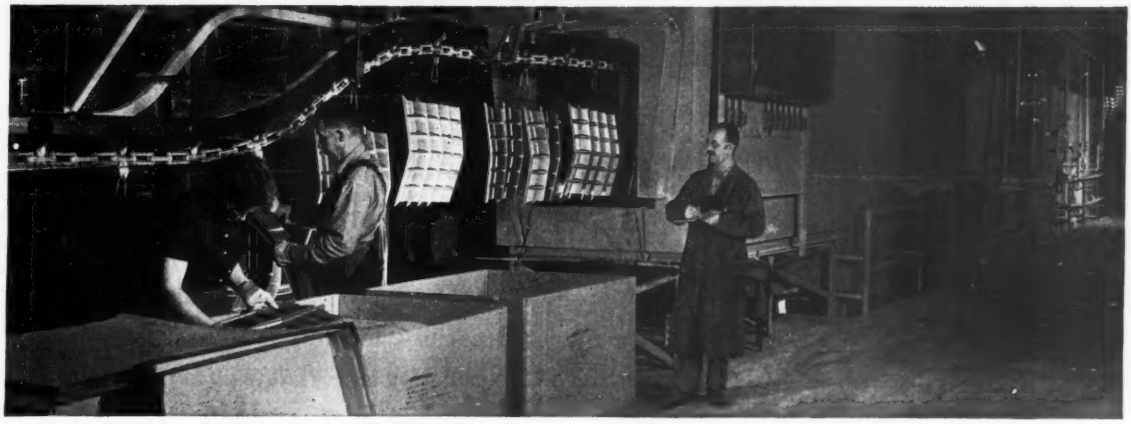
* * *

SIGNS OF ADJUSTMENT: We are in a period when it is easy to misinterpret the significance of daily events. Early prospect for a cease-fire agreement in Korea, continued lethargy in demand for soft goods in retail markets, idle resources in several metalworking centers, a noticeable easing of the pressure of demand for some steel items that have been tight, declining prices in the stock market and finally a pronounced weakness in cast ferrous scrap are signs which cannot be ignored.

Obviously they mean that the national economy is undergoing adjustment. It does not necessarily follow that a general let-down in business is imminent. Demand for the output of a large portion of our capacity is sufficient to maintain general activity at high levels for months. However, the present spotty situation does warn us that it will take a lot of business to keep our expanded plants busy in normal times.



BONDERIZING



PAINTING, BAKING

INTEGRATED WITH STAMPING, WELDING, POLISHING, ASSEMBLING IN FAST, STRAIGHT-LINE PRODUCTION

AT Firestone

THE mass production of medium and large-size stampings in the Firestone Metal Stampings Division does not always stop at the stamping presses. The jobs requiring special processing and sub-assemblies are handled through welding, heat treating, special testing, assembly and finishing on modern, efficient straight-line production facilities which assure you of lowest costs and high-speed deliveries.

Wide experience in serving the Automotive, Appliance and Defense Industries is your assurance of outstanding quality.

It will pay you to figure with Firestone. For complete cost analysis on Stainless Steel, Carbon Steel and Aluminum Stampings and Sub-Assemblies send drawings or blue prints to Metal Stampings Division, Firestone Steel Products, Akron 1, Ohio.

Copyright, 1952, The Firestone Tire & Rubber Co.

Using Unfamiliar Alloys?

Here's How to Remove THE RISK

Today, when Government restrictions are enforcing the use of leaner alloys with unfamiliar heat treatment response, you'll find Ryerson Alloy Service more helpful than ever. The tests we make to assure quality, verify analysis and guide your heat treating are your best protection against costly production errors.

For example, we put every heat of Ryerson Alloy through four separate hardenability tests. The result: Positive knowledge of the hardenability of every shipment of Ryerson alloy. These tests enable you to buy on the basis of hardenability, in addition to analysis—*the only really safe way to buy alloys under today's conditions.* All test information—hardenability, analysis, etc.—is carefully recorded on a Ryerson Alloy Certificate which is delivered with your steel as a guide to heat treatment.

Don't take today's alloys for granted. Order by hardenability from Ryerson and be doubly sure. Some shortages are inevitable, but, as always, we'll do everything possible to meet your requirements. So, for any steel need, phone the Ryerson plant nearest you.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC.—PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

FREE STEEL MAY BE A REALITY BY YEAREND—ALUMINUM, TOO

. . . the reasons: expanded facilities, lower consumer demand, a year's extension of defense goals

Decontrol Timetable Takes Shape

Steel and aluminum controls may end by next Dec. 31. Wage and price curbs will be dented repeatedly from now on and may expire altogether within one year

A TIMETABLE for decontrol of some metals, wages and prices takes shape.

No Washington planner will officially admit that an easing of economic curbs is imminent, but many privately predict approximate termination dates. All estimates would have to be moved further ahead, of course, if the Korean War spreads or if major strikes occur in any of the principal basic metals industries.

No Definite Prediction—On the basis of what they can sight in the coming months, NPA officials can see little reason to expect that CMP allotments of steel and aluminum will be necessary beyond the end of this year. They feel that copper, perhaps, may have to be continued under CMP for a longer period, and so will nickel. Otherwise, they look forward to an increasingly open situation in materials as 1952 progresses.

As materials become easier to obtain, some of the pressure to boost prices will ease, but counterbalancing that deflationary trend will be the inflationary one of generally higher wages that are certain to come in the next three or four months. Thus, clamor for price controls will continue, especially from labor unions. But only watered-down price controls may be possible after next June 30 because of the likelihood that weaker machinery will be permitted when the Defense Production Act is extended. In its present form it expires June 30.

Ditto—If price control machinery is weakened by the Defense Production Act extension, wage controls will have to be, too. The unions will see to that. Even the lighter wage and price controls may be out completely one year from now because the odds are that the defense act will be extended only to February, 1953, when a Republican administration might be in the saddle.

By that time price and wage controls may be little more than formality, anyhow. They are due for a beating in the next few weeks when the steel case is resolved. And they'll be dented steadily over the next few months as the effects of the steel decision fan out to the rest of industry.

The Causes—Basically, the real grounds for hope that we'll have relief from metals, wage and price controls lie in the easier materials situation. The principal reasons for increased metals supplies are: Expanding capacities in steel and aluminum and to a lesser extent in copper; the extending of defense production goals by one year; the decline in sales of civilian goods to such an extent that even all the limited production may not be sold; and the slight decline in the materials-consuming expansion of defense production facilities.

NPA Gives an Inch on Some CMP Allotments

THE PENDULUM of controlled materials is nudging gently toward an easier supply in the second quarter of 1952. But, allotments will still be smaller in the second quarter than in the first quarter, 1952, especially for consumer durables down 14 per cent in aluminum and copper.

Main beneficiaries of the easing will be "less essential" durable goods makers and small civilian goods producers. But other manufacturers will benefit slightly, too.

Drop in the Bucket—In the final adjustment of second quarter allotments a reshuffling of about 1 per cent of the total supply leaves a few NPA classifications better off. For example, the Defense

Minerals Administration will get 11,000 more tons of steel than previously announced; Iron & Steel Division will get 300,000 additional pounds of copper and copper alloys; the automotive industry will get 1 million more pounds of aluminum, as will the General Industrial Equipment Division, and Metalworking Machinery Division will get 850,000 more pounds of aluminum.

Manly Fleischmann, Defense Production Administrator, emphasizes that there will be no substantial changes in program levels from those previously announced (STEEL, Jan. 21, p. 35).

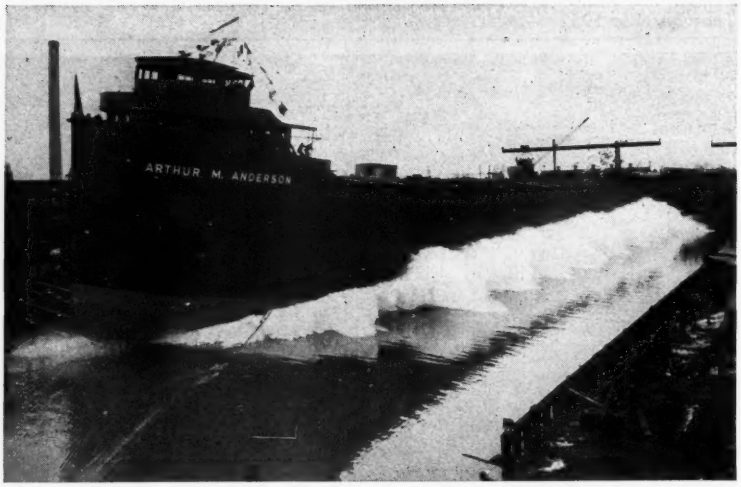
More and Less Essentials — From the NPA "Reserve for Adjustment of Allotment Levels For Consumer Items" the consumer durable division will get 27,000 tons of steel and 2.8 million pounds of copper in the second quarter in addition to the regular allotments. Doles from this special fund will be used to implement aid to "less essential" product lines like cigarette lighters, jewelry, and toys. In first quarter, 1952, these less essentials got a 50-10-20 percentage take of pre-Korean usage of steel, copper and aluminum. For second quarter they are to get a 50-25-25 percentage, bringing them up closer to "more essential" durable goods allotments of 50-30-30 (STEEL, Feb. 18, p. 66).

A new kitty of controlled materials has been set up for the relief of small makers of civilian goods. Intended for only the hardest hit cases, materials from this Small Business Hardship Account will be allotted on a case-by-case basis.

Decontrols on Steel Strip Urged

Shortages of cold-rolled strip steel are ended and controls over it should be lifted to prevent crippling industry and steel consumers, says Charles M. Beeghly, vice president of Cold Metal Products Co., Youngstown.

"There just isn't any present or anticipated shortage of cold-rolled strip steel, Mr. Beeghly said. "Government controls on the production and use of this product are now not only unrealistic but will add to the economic burden of many companies in the coming months."



BIG SPLASH: The ore carrier *Arthur M. Anderson*, built for U. S. Steel's Pittsburgh Steamship Division fleet by the American Shipbuilding Co., slides down the ways at Lorain, O., on Feb. 16. The 647-foot-long boat is one of three which will up the fleet's ore carrying capacity by 2.2 million tons a year

Two-tone Picture in Scrap

The easier market in cast grades of scrap is spreading no apathy to buyers of steelmaking grades of scrap.

Easing in the cast market stems from a decline in business volume of foundries.

Demand for steel, however, continued high. And, too, the steelmaking capacity is being increased. Consequently, demand for steelmaking grades of scrap continues strong.

With the cast scrap supply improving and the foundry demand for it lessened, foundries are cutting down on the amount of freight they are willing to pay to get it.

Allegheny Cuts Silicon Output

Allegheny Ludlum Steel Corp. is cutting back silicon steel production. The company, a main producer of silicon steel, is suspending its production in the electric furnaces at its plant at Brackenridge, Pa. The cutback, says the company, results from the reduction of automobile and civilan goods production by government directive, from the drop in consumers' inventories, and the copper shortage.

Structural Fabricators Want More Building Approved

STRUCTURAL steel fabricators face a serious unemployment and idle plant capacity for early summer unless the government immediately releases an adequate volume of approved orders for construction, says R. D. Wood, president of the American Institute of Steel Construction Inc.

The industry's backlog is considerable, Mr. Wood says, but a large part of it is only theoretical as long as NPA does not release the steel for projected construction. The high level of production in 1951 will decline as the defense program nears completion, and unless long range planning is encouraged, operations cannot be maintained at that level. Mr. Wood says that this attitude was expressed by fabricators from all over the nation.

The institute recommends a three-point program. DPA officials should meet with the Structural Steel Fabricators Industry Advisory Committee to NPA to discuss the situation. Then DPA should encourage long range planning with assurances that controls will be relaxed. Finally, for immediate relief to small fabricators who have not shared proportionately in defense work, DPA should approve an increase in tonnage of structural steel which can be self-authorized without red tape.

Small Companies Face Wage Crisis Too

After the steel settlement, a volcano of union demands will erupt on metalworking companies. Learn the cost of fringe benefits before you sit down to bargain

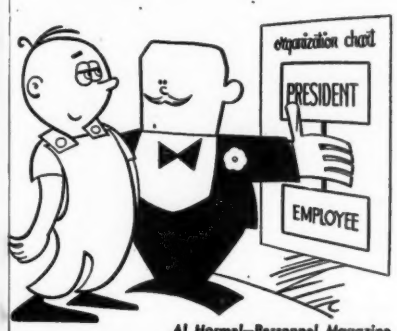
PREPARE NOW for widespread and high-powered labor demands after a steel wage settlement. That advice applies as much to small metalworking companies as to the industrial giants.

While presentations of both steelworkers and steel companies has ended and both sides await final recommendation from Wage Stabilization Board, union business agents are readying a barrage of demands on the many small companies whose contracts expire this coming spring.

Bewildering Array — The steel settlement can't be applied in toto to all industry. Studies show the force of a big industrial wage decision loses momentum in direct proportion to the size of the individual firm. Still, the impetus this year will be terrific. A bewildering array of demands from unions will still be presented for fringe benefits—vacations, holidays, premium pay and the like.

These fringe benefits, having WSB's benign approval, will be legal extras on top of basic hourly wage gains unions can secure. Unless you know what this "hidden payroll" will cost, you may become obligated far beyond your financial power to perform.

What's the Cost—A study made by Associated Industries of Cleveland shows that city's manufacturers are spending 24.8 cents an hour on employee benefits and services.



Al Hormel—Personnel Magazine

LABOR DEMANDS
. . . company size is important

That figure is typical of the national scale because of Cleveland's diversity of industry and no single-union domination.

Here are some common fringe issues that will arise in your negotiations this year:

Cost-of-Living Clause—Demands for the escalator clause, always strong in good times, will be heard this year by companies of all sizes. It's the best bet for labor to make dollar and cents wage gains through WSB.

Improvement Factor — Small firms can't always put in new equipment and make the technological strides that permit greater production and make this provision practical. It will be used to pry out other concessions though.

Union Shop, Dues Checkoff — Small companies will face this issue as much as larger ones. They get WSB approval and the unions want them to strengthen their hand as bargaining agents.

Holidays — Standard number of paid holidays is six. If you don't give this number, expect to face demand for it this year. Already large companies are being asked for seven or eight holidays.

Vacations — Prevailing vacation program is one week for one year's employment, two weeks for five. Pressure is for longer vacations with longer service.

Pensions—Big firms are in better financial position to offer a retirement program; strong demands on the 500-or-less employee company won't come immediately. Associated Industries of Cleveland found only 40 of 216 firms in the under-500 employee classification have established pension plans.

Insurance — Small companies should check their bill on group insurance. Cost of employer-employee financed hospitalization programs should be learned before making commitments. Moderate programs will be accepted by unions now. They can expand them later.

Checklist for Bargaining

FIND where you're vulnerable. Learn what other companies of your size, location and type are doing contract-wise.

DON'T obligate yourself by any contract clause without finding out how much it's going to cost

DON'T compromise your company's future. Buying short-term peace may be costly. A small fringe cost today may be a balloon in your budget tomorrow.

SET a definite policy on personnel practices relating to fringe benefits. Apply it consistently.

ESTIMATE the economic punch of a strike on your company. Several hundred employees can often be absorbed in the labor pool with scarcely a ripple.

DON'T base your arguments on principle. Facts pack more weight around a bargaining table.

When a Strike Ends

After a 20-week walkout, Carboloy finds resuming normal operations a big job

AN OWL made a home in a blower and when driven out took with him the carcass of a rabbit.

That's one of the less serious situations that arose when Carboloy Department of General Electric Co., Detroit, began to resume operations after a 20-week strike ended Jan. 31. Completely normal activity hasn't been achieved yet, but it soon will be, thanks to an advance schedule worked out for getting back into production of Carboloy's cemented carbide tools, dies and other items.

Prearranged—That schedule was planned last December. Manager of Manufacturing J. A. Muldoon fixed the responsibility on supervisory individuals for handling the recall of personnel in all manufacturing departments (all salaried people remained at work throughout the strike, taking courses in management training, first aid, etc.).

The schedule called for checking and repairing in sequence all machinery and equipment in the plant's several buildings. First building to come under the maintenance crew's scrutiny was No. 6 —Metal Building—where nearly all of the 130 furnaces are located. The blower fans were the first order of business. On the roof and

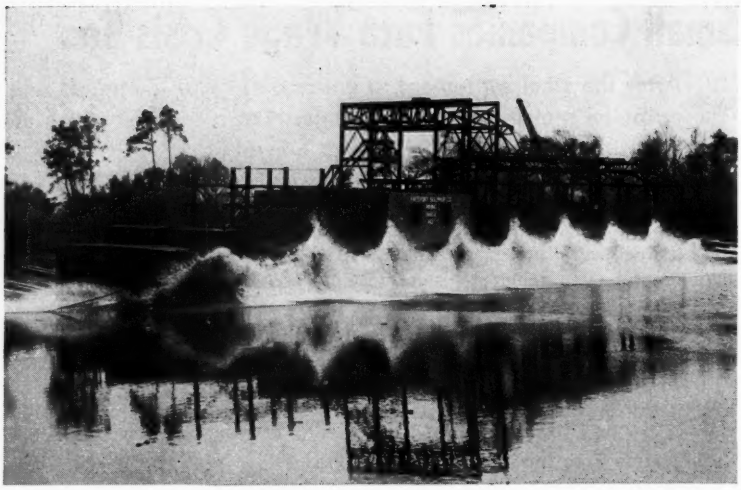
exposed these had to be in operating condition before other machinery and the furnaces began to function.

In Shifts—On Feb. 1, a day after the strike ended, the service, maintenance and electrical men returned to work. The shipping department also began operating, getting orders out from inventory as soon as a physical check had been made. Production workers were recalled by telegram for the Metal Building for Feb. 4 and shipments of raw materials from that operation began that day. By Feb. 6 the Tool & Die Fabricating Department was in operation, this being the last of five parts of the company's activities to start rolling.

In the course of the reactivation every bearing and shaft had to be lubricated, all hydrogen lines cleaned out, sewers and sumps flushed, work in progress and completed inventoried, every machine and all the plant's wiring and plumbing checked, supplies of raw materials and commissary items taken in, new parts rushed in for replacement.

So-So—Response of men to the recall varied widely by departments. On some operations only 40 per cent of the normal complement came back on the first day of work; in five days, which the union contract provides as call-back notice, 75 per cent had returned. Generally, slightly more than 80 per cent of the work force returned. Hiring will soon begin to fill out the ranks.

Besides the job Carboloy had to get its production rolling again, it had to retain the good will of its customers. A major instrument to solve that phase of the problem was a letter to the customers the day the union voted to return. Customers were asked to designate the five orders—and the degree of urgency—to which Carboloy should give first attention. Throughout the strike, Carboloy's sales department gave information on where stocks of particular items could be found and even suggested alternate materials. At the outset customers were informed about the strike's issue: Whether the company had the right to transfer parts of its operations and to employ whom it wanted to man those operations.



SULPHUR BOATS IS A-COMIN': From this 200-foot steel barge, being launched near New Orleans, Freeport Sulphur Co. will mine sulphur in the Louisiana marshland at Bay Ste. Elaine. The portable plant will supply nearly 2 million gallons of superheated water a day to melt the sulphur deep underground. Production of the vital material will start later this year

Mr. Reuther Wants Annual Wage

More than automakers' anniversaries are being celebrated currently. A rally commemorating the fifteenth anniversary of the signing of the first General Motors-United Autoworkers contract was held in Flint last week. The stories traded about experiences during the 44-day sitdown strike were of less significance than Walter Reuther's airing of his plans for the union's next demands on General Motors and the entire industry. A guaranteed annual wage will be sought. "We don't expect the corporation to pay you when you don't work, but they'll find a way to keep you working when they're paying you an annual wage," Mr. Reuther told the crowd.

Employment Rises to 46 Million

Some 268,000 fewer production workers were employed by U. S. manufacturing plants in January, 1952, than in January, 1951, estimates the Bureau of Statistics.

The over-all decrease in production workers was nearly matched, though, by an increase in employment of nonproduction workers—240,000 from January, 1951, to January, 1952. Relatively little change was reported in overhead employment by contracting industries, such as textiles, and the addition of nonproduction workers in expanding defense industries, such as aircraft and machinery, was at a faster rate than production men.

Despite the loss of production workers, the total number of people employed by business and government rose to 46 million in mid-January, 1952 — an increase of 700,000 over January, 1951. Additions to government payrolls (federal, state and local) accounted for about 60 per cent of the total increase. And about two out of every three persons added to governmental payrolls went into civilian jobs for defense activities such as arsenals and navy yards.

Aluminum: More Press, Stress

More powerful equipment for processing aluminum is being ordered by two companies, Aluminum Co. of America and Kaiser Aluminum & Chemical Corp.

Alcoa is ordering a new two-way "stretcher", having a 3 million pound pulling capacity, to be used at the company's Lafayette, Ind., extrusion works. The "stretcher" will exert a force, says Alcoa, comparable to a tug-of-war between 19 three-unit Diesel locomotives on each team with an aluminum extrusion in the middle.

Kaiser Aluminum will build two new forging presses to mass-produce aluminum aircraft parts. One

of the presses will stand nine stories high and will be rated at 35,000 tons hydraulic pressure; and the other 25,000 tons hydraulic pressure.

New Aluminum Process Disclosed

Aluminum has been produced at a substantial saving of electricity with the aid of atomic formulas. A development of the British Columbia Aluminum Co., the metal was cast first in November, 1951, but was kept under security wraps by Canadian and U. S. governments.

Alfred Vang, president of the Canadian firm and former scientist for the Army's Manhattan Project during World War II, said that a long-wave type of electricity was used. It is a square wave produced by a "magnaquanta converter." The long-wave electricity was discovered by application of the same mathematical formulas which led to the development of the atomic bomb.

The new type of electricity reaches the furnaces at about 8 volts and 1600 amperes. Mr. Vang says that it will reduce the electricity requirements for making aluminum by up to 30 per cent.

Second Big Taconite Plant Planned

Erie Mining's proposed facility, plus Reserve Mining's plant under construction, would eventually provide 20.5 million tons of iron concentrate pellets a year

SECOND project to make taconite available in commercial quantities as a substitute for iron ore is in the making.

Backer is Erie Mining Co., which applied to the Defense Production Administration for a certificate of necessity covering a $300 million development that ultimately would produce 10.5 million tons of iron concentrate pellets annually in Minnesota.

It All Depends—Final decision to go ahead with the development depends upon action taken by the government on the company's application and the solution of certain tax problems.

Last fall the first move to make taconite pellets available in commercial quantities was made by Reserve Mining Co. It announced it would begin immediately to build a 2.5-million-ton-per-year beneficiating plant at Beaver Bay, Minn. Provision is being made in that project to enlarge it as required to a 10-million-ton-per-year processing facility.

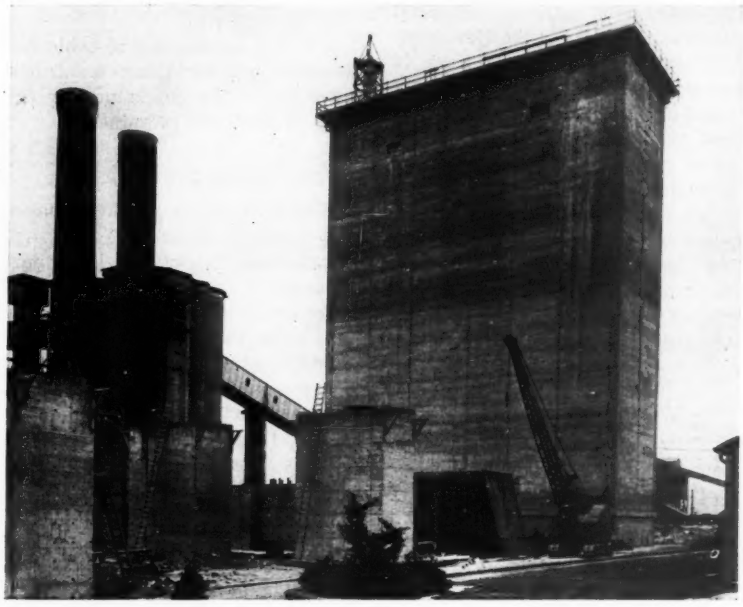
One Fourth—If the two projects are brought to completion they would provide a total 20.5 million tons of iron concentrate pellets a year from the Lake Superior region. This would be equivalent to 23 per cent of last year's consumption of Lake Superior ore.

Erie's program calls for construction of a plant on the Mesabi Range northeast of Aurora, Minn., to produce the concentrated iron pellets from taconite, the low-grade iron formation which abounds in Minnesota. It calls also for building a new community east of Aurora for the plant employees and their families, a large power plant, and a railroad to carry the pellets from the plant to docks and loading facilities at Two Islands, Minn., on the shore of Lake Superior.

Continuing—If Erie's project is undertaken, the initial unit would have an annual capacity of at least 5 million tons. This rate would be attained after four or five years. Construction of additional units would continue until production is at the rate of 10.5 million tons a year. For several years Erie has operated a taconite plant at Aurora for experimental purposes. Last year it produced and shipped about 70,000 tons of pellets.

Erie is owned principally by Bethlehem Steel Corp. and Youngstown Sheet & Tube Co., with minority interests being held by Interlake Iron Corp. and Pickands Mather & Co.

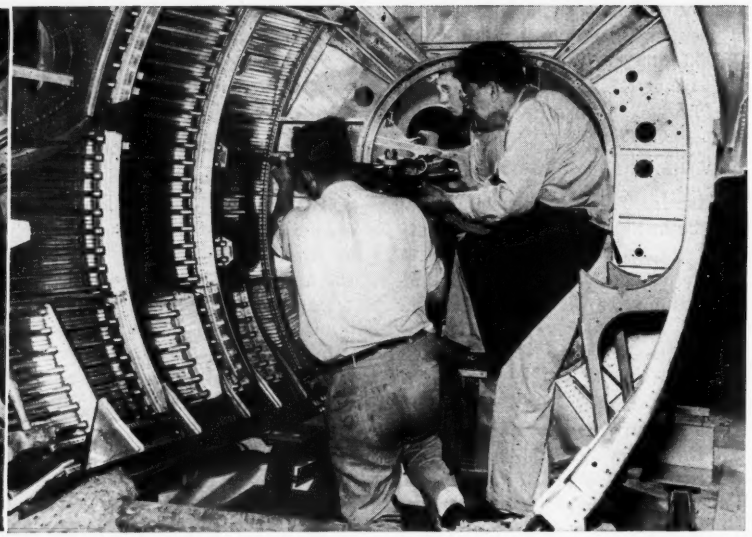
Reserve Mining Co. is owned by Armco Steel Corp. and Republic Steel Corp.



TALL STORY: Standing 122 feet high, the new silo at the Maple Grove, O., quarries of Basic Refractories Inc. will hold 10,250 tons of dolomite. Part of a $3.5 million expansion program the new plant will also include two rotary kilns on the concrete piers in the foreground, two 215-foot steel stacks and finished product and coal handling sections. The kilns will measure 390 feet long. Production will increase about 300,000 tons annually

Bethlehem Builds Super Tankers

Bethlehem Steel Co. will build the largest tankers ever built within the next two years. The order was placed by World Tankers Inc. for two 700-foot-long, 45,500-ton oil tankers propelled by single screws. Estimated cost will be $10 million.



United Press

NEST OF STEEL: An installer checks his assembly list against a nest of stainless steel baffle rings at the Fairchild Aircraft Hagerstown plant. The rings are for engine mounts on C-119 Flying Boxcars

HOUSE OF STEEL: One of the first all-stainless steel nacelles built by Solar Aircraft Co., San Diego, Calif., is readied for delivery to Lockheed where it will be installed in the P2V-5 Navy patrol plane. The engine housing, which weighs only 175 pounds, will support an engine weighing 3500 pounds. Stainless steel was used to obtain more structural strength with less weight

U.S. Defense Jobs Abroad? Ideas Hit

AMERICAN manufacturers seeking to use idle facilities in defense work are beginning to object to the U. S. placing large orders for defense work in foreign plants. The recent Air Force purchase of F-86E jet fighters from Canada is an example of this outside-the-nation buying policy. Between now and June 30, the Defense Department may place $600 million worth of defense work in European plants.

No Logic—Quick to react to the Defense Department's proposal was the Commerce & Industry Association of New York Inc. Thomas J. Miley, executive vice president of the association, in a letter to Robert A. Lovett, secretary of the Defense Department, calls for the scrapping of the plan. With an estimated 1100 machine and metal fabricating plants in the New York area looking for defense work to occupy men and machines now standing idle, the association feels that there is no logic to the plan to let abroad the half billion dollars' worth of defense work.

Mr. Miley says that a plan proposed by the association in December for compiling a nation-wide inventory of available machine tool capacity had not been acted on by Charles E. Wilson, defense mobilizer, and others to whom the plan had been submitted. The association proposed that local chambers of commerce and trade associations compile data for procurement offices so defense work could be channeled into areas in need of contracts.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $250,000 in value.

PRODUCT	CONTRACTOR
Machines and equipment	Brown & Sharpe, Providence, R. I.
Drill Presses	C. H. Gosiger Machinery Co., Dayton, O.
Motor Driven Lathes (2 contracts)	R. K. LeBlond Machine Tool Co., Cincinnati
Roller Bearings	Hyatt Bearings Div., General Motors Corp., Detroit
Aircraft Hardware	George K. Garret Co., Philadelphia
Fork-lift Trucks (2 contracts)	Service Caster & Truck Corp., Albion, Mich.
Extractors	Underwood Corp., New York
	Garreau & Co. Inc., Newport, R. I.
Showers	Noland Co. Inc., Washington
Heaters, 52-513 B.	Vogt Bros. Mfg. Co., Louisville
Light Trucks	Willys-Overland Motors Inc., Toledo, O.
	Chevrolet Div., General Motors Corp., Detroit
Radio Sets	Crosley Div., Avco Mfg. Co., Cincinnati
	Garod Radio Corp., Brooklyn, N. Y.
	Lewyt Corp., Brooklyn, N. Y.
	Tele King Corp., New York
Radiosondes	Friez Instrument Div., Bendix Aviation Corp., Detroit
Receiver-Transmitters	Allen B. Dumont Labs., Clifton, N. J.
Dynamotors	Industrial Spring Corp., Chicago
Reperforator Transmitters	Teletype Corp., Chicago
Mountings	Kings Electronics Corp., Tuckahoe, N. Y.
Electron Tubes	R.C.A. Victor Div., Radio Corp. of America, New York
	Raytheon Mfg. Co., Waltham, Mass.
Multimeters, TS-297	Industrial Television Inc., Clifton, N. J.

Labor Surplus Areas Picked

Eighteen major and five smaller labor market areas have been designated as districts of labor surplus and will be eligible for special consideration by the government in placing defense contracts.

Major areas (districts having at least one central city with a population of 50,000 or more) are: New York; Detroit; Providence, R. I.; Wilkes-Barre-Hazleton, Pa.; Grand Rapids and Flint, Mich.; Scranton, Pa.; Beaumont-Port Arthur, Tex.; Fall River and Lawrence, Mass.; Altoona, Pa.; Brockton and Lowell, Mass.; Atlantic City, N. J.; Asheville, N. C.; Manchester, N. H.; Terre Haut, Ind.; and Laredo, Tex.

Smaller areas are: Pottsville, Pa.; Herrin, Murphysboro-West Frankfort, Ill.; Uniontown-Connellsville, Pa.; Cumberland, Md.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

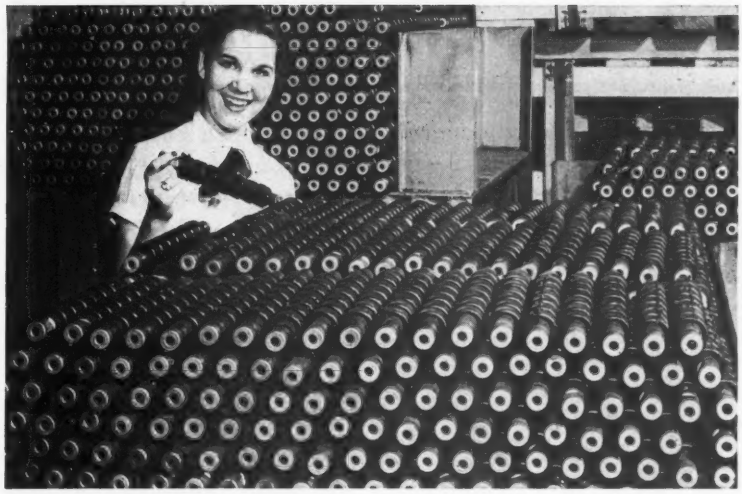
Materials Orders

AIRCRAFT STEEL — Amendment of Feb. 14, 1952, of Schedule 1 to NPA Order M-6A requires warehouses and distributors to earmark aircraft quality alloy steel for use in gas turbine engines or aircraft-type internal combustion engines for use in naval vessels, in addition to use for aircraft, guided missiles and the atomic energy program.

COPPER WIRE MILL PRODUCTS—Amendment of Feb. 14, 1952, of NPA Order M-86 brings this copper wire mill products distributors' order into fuller conformity with the Controlled Materials Plan.

BRASS MILL PRODUCTS — Amendment of Feb. 14, 1952, of NPA Order M-82 brings this brass mill products distributors' order into harmony with the Controlled Materials Plan.

USED TIN CANS—NPA Order M-98 issued Feb. 14, 1952, and made effective that date directs the flow of used tin cans in nine counties in California and two counties in Arizona to shredding plants where they are prepared for use in producing copper through a chemical precipitation process. In recent months, part of this regular supply of scrap cans was diverted to steel mills, thus hampering firms which precipitate copper from run-off water in and about copper mines. M-98 became effective Feb. 14.



VIBRATION REDUCERS: An employee of the B. F. Goodrich Co., Akron, inspects a pile of rubber covered bushings for light tank track assemblies being built by Goodrich. The bushings decrease vibration and provide resilience

Price Regulations

BUILDERS' HARDWARE — Supplementary Regulation 22 to Ceiling Price Regulation 22 provides three uniform adjustment factors which all manufacturers of builders' hardware may apply uniformly to ceiling prices established under the General Ceiling Price Regulation. SR 22 became effective Feb. 19.

ZINC DIE CASTINGS—Amendment 5 to Ceiling Price Regulation 60 authorizes an upward adjustment in ceiling prices of zinc-base die castings because the industry's current earnings are below the minimum required by the industry earnings standard. The amendment, effective Feb. 19, 1952, permits reflection of cost increases resulting from increases in the prices of zinc and zinc-base alloys.

GE's Defense Suppliers: 17,000 Firms

DEFENSE production is a co-operative effort, says General Electric Co. The company requires 17,000 businesses throughout the country to help it produce jet engines, aircraft instruments, radar and turbosuperchargers, gunfire control systems for aircraft and ships, guided missiles, torpedos and other items.

At least 80 per cent of those 17,000 suppliers are small businesses employing 500 or fewer. A sampling of 900 suppliers shows that they in turn do business with nearly 50,000 organizations classified as small businesses. Of the $600 million in defense contracts that GE holds, more than half of that goes to suppliers.

To play its role in the defense production tier, says GE, it must provide some of the research needed to manufacture better defense products. To do that, it will build a $30 million aircraft-turbine research lab at Lockland, O., that will consist of five structures plus service facilities on a five-acre tract. GE previously had announced about $60 million in expansion at the Lockland jet center.

Wanted: Aluminum for Tools

Lay-offs of 20 to 40 per cent of skilled tool makers will occur in the portable electric tool and portable pneumatic tool industries unless reduced aluminum allotments are supplemented, reports advisory committees of the two industries to NPA. Both industries are slated to receive in the second quarter 80 per cent of screened requirements for military orders and 44 per cent for non-military.

DPA Revises Amortization Rules

Fast tax amortization will be harder to obtain after Mar. 1 under the new regulations released by the Defense Production Administration. Before a firm can begin installation or construction of facilities costing more than $100,000 for which it desires a certificate of necessity, it must apply to DPA for prior approval based on the essentiality of the product involved and the availability of construction materials needed.

If the cost is below $100,000, construction may begin before this approval but only after the firm has made application for its fast write-off.

SDPA Approves Two RFC Loans

Loans totaling $191,250 for defense work were granted by Reconstruction Finance Corp. to H. R. Koch Mfg. Co., Jackson, Mo., and Gadsden Box Mfg. Co., Gadsden, Ala., upon recommendation of the Small Defense Plants Administration. Under defense contracts, Koch manufactures compression moldings of plastic materials, and Gadsden makes ammunition boxes. SDPA previously approved a RFC loan to the J. C. Harman Co., Montgomery, Ala., to make folding cots.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Measure before Congress would set up a bureau empowered to shut down unsafe plants in any industry and could open way for broad new government control

SINCE the recent Illinois coal mine disaster increased pressure is being brought on Congress to enact legislation authorizing the government to shut down plants not conforming to prescribed standards of safety. Chief interest is in two measures before the Senate Committee on Labor and Public Welfare.

One is the Neeley bill (S. 1310) which would authorize shutting down coal mines held unsafe. The other is the Humphrey bill (S. 2325) which would permit shutting down an allegedly unsafe plant in any industry.

Intolerable—This latter bill has industry representatives in Washington worried. The Humphrey proposal opens the way for broad new government control that could be made virtually intolerable to management.

It would set up in the Labor Department a Bureau of Accident Prevention, to encompass an Accident Prevention Board for each industry in the United States "as determined by the secretary of labor." Each would consist of nine members, four from management, four from the workers, and one representing the public.

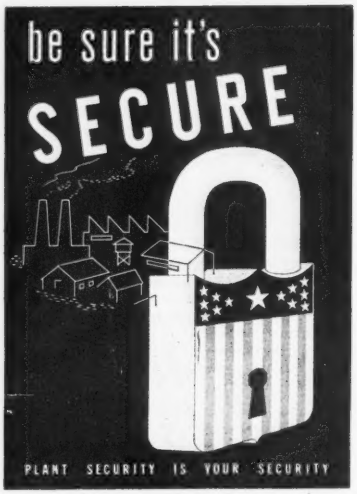
Mandatory—These boards would recommend, and the secretary of labor promulgate, rules and regulations which would be mandatory on industry—with fines and jail sentences to nonconformers.

No definite action yet has been slated for the Humphrey measure but this situation could change overnight in view of the fact that Hubert H. Humphrey (D., Minn.) is chairman of the subcommittee in charge of the Senate bill.

Co-operation Wanted . . .

The Plant Security drive which was launched early last year by the Munitions Board has attained its first objective: Alerting management to the need for positive protective programs to guard against loss of production through sabotage.

The Munitions Board now is embarking on the No. 2 step. This is alerting of plant workers to obtain their full and effective co-



PLANT PROTECTION POSTER
. . . alert workers to sabotage danger

operation in uncovering saboteurs and preventing them from carrying out their plans.

Educational — The campaign among workers will be of an educational character—ever emphasizing such ideas as:

"Espionage agents and saboteurs might be trusted employees, working next to you every day."

"Be sure that all blueprints, drawings, specification sheets or other important papers are properly protected while in your possession, and not left for unauthorized persons to see."

They're Free—Messages of this kind are conveyed in printed form —often as posters or cartoons drawn by the country's leading artists. This material will be sent free to companies filing requests with the Office of Industrial Security, Munitions Board, Pentagon, Washington 25. State quantities of each piece desired. First mailing will be made about Mar. 7, with monthly mailings thereafter.

"If we develop among workers a proper understanding of the importance of this job of plant protection we will have made great progress toward achieving this obpective," says Col. Leroy Hudson, chief of the Office of Industrial Security. "Once workers become aware of possibilities for sabotage we can count on their best efforts to prevent it."

Sitting on Secrets . . .

Public Law 256, known as the Invention Secrecy Act of 1951, approved by the President on Feb. 1, has a two-fold effect.

It gives the government authority to withhold the subject matter of patents whose disclosure in the opinion of the secretary of commerce would be detrimental to the national security. Secondly, the inventor is assured of payment of damages resulting from the order of secrecy as well as compensation for the use of the invention for defense or otherwise in the national interest.

Full Settlement—The act authorizes the head of the interested government department or agency, upon presentation of a claim, to make an agreement with the applicant "for the damage and/or use."

If full settlement cannot be affected, the head of the department or agency may award and pay to the applicant a sum not exceeding 75 per cent of the sum which the department or agency head considers just compensation. If the applicant is dissatisfied he may bring suit against the government in the Court of Claims or in the District Court of the United States for amounts he considers justifiable.

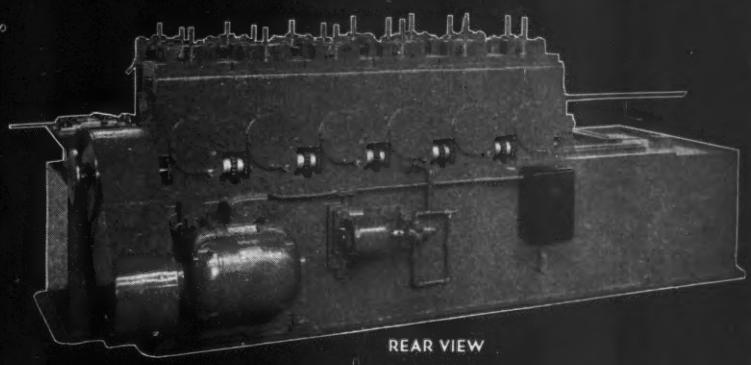
No Disclosure — On the other hand, disclosure of an invention to which a secrecy order has been applied is punishable by fine of $10,000 and/or imprisionment up to 2 years. Copies of the new law may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25.

McKAY

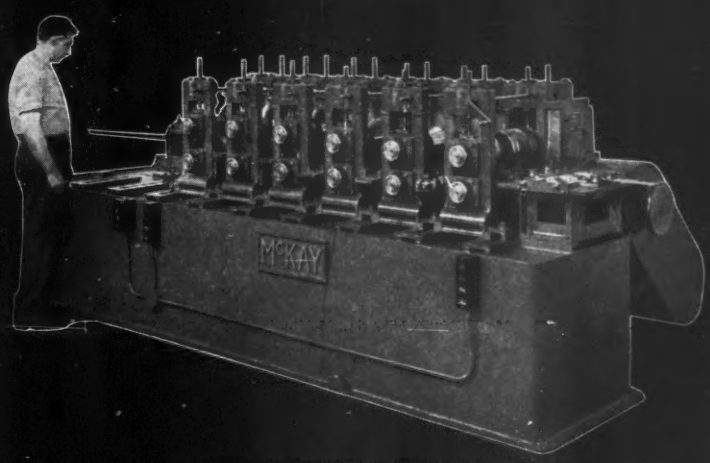
ROLL FORMING MACHINES FOR PRODUCING SHAPES FROM FLAT STRIP

There's a McKAY Machine to Make Every Section

McKAY MICROMETER (patented)



REAR VIEW



STANDARD FEATURES

MICROMETER ADJUSTMENT. All pressure points on top shaft controlled by simple crank motion, through worm and gear reduction. Top shaft is ALWAYS PARALLEL. Micrometer dial furnishes visible check on roll pressures.

TYPICAL RUGGED McKAY CONSTRUCTION. Standardized units, choice of gearing, anti-friction bearings throughout, all gears between bearings. NOT OVERHUNG.

INTERCHANGEABLE GUIDING EQUIPMENT. easily adjusted, quickly removable.

MINIMUM CHANGEOVER TIME. All units engineered to allow complete roll change in shortest possible time.

LOW MAINTENANCE COST. All of the foregoing features, plus precision workmanship and up to the minute engineering, are a guarantee of low maintenance.

OPTIONAL FEATURES

BASE EXTENSION. Permits increasing the number of roll passes to meet future requirements, by the addition of standard housing units at a later date.

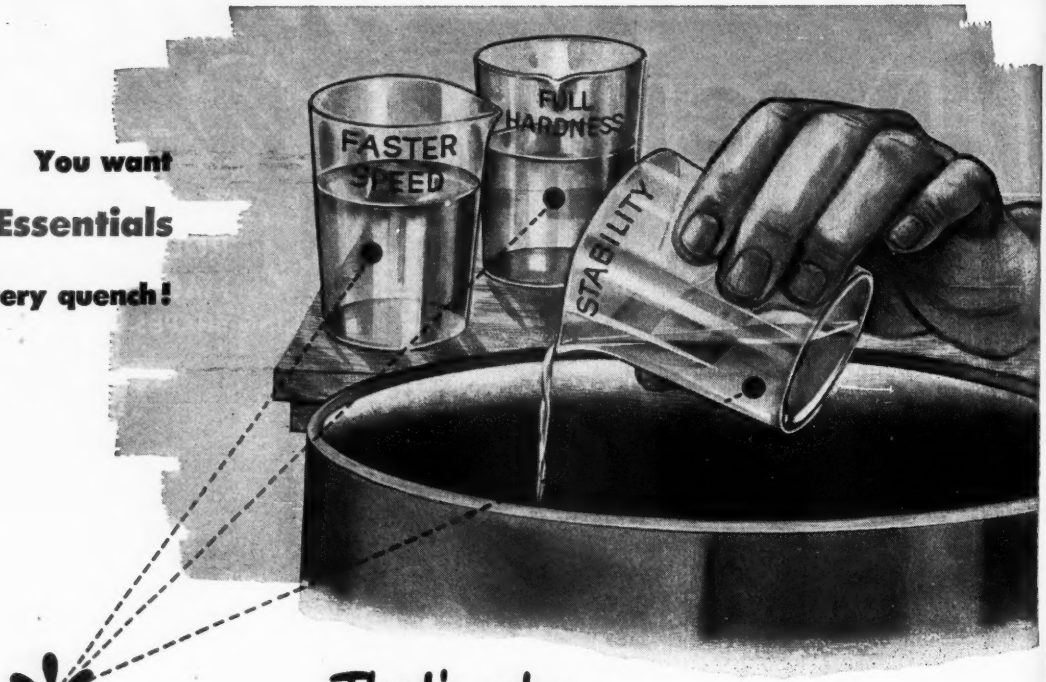
MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base

ENGINEERS AND MANUFACTURERS OF
TUBE MILLS
USING
ELECTRIC RESISTANCE WELD
OXY-ACETYLENE WELD
ATOMIC HYDROGEN WELD

The **McKAY MACHINE** Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

McKAY

PERFORMANCE RUGGEDNESS PRECISION AND SAFETY



That's why

HOUGHTO-QUENCH

is ideal for heat treating "Lean Alloy" Steels

Get a *faster* quench through the critical zone. Meet high physicals safely with *full hardness*. Be sure of *uniform* quenching regardless of type of steel or temperature.

Use *Houghto-Quench*—the stable oil developed by Houghton to give you these three essentials in meeting critical quenching needs today.

Ask the Houghton Man to show you why Houghto-Quench gives you maximum hardness—even with present day low alloy steels. Or write to E. F. Houghton & Co., Philadelphia 33, Pa., for prompt information and prices.

ONE SOURCE FOR ALL NEEDS OF METALWORKING

Get "Liquid Salt Baths"—Houghton's latest booklet covering heat treating salts for carburizing, neutral hardening, annealing, tempering, martempering and other heat treating operations. Write to E. F. Houghton & Co., Philadelphia 33, Pa., or ask the Houghton Man.

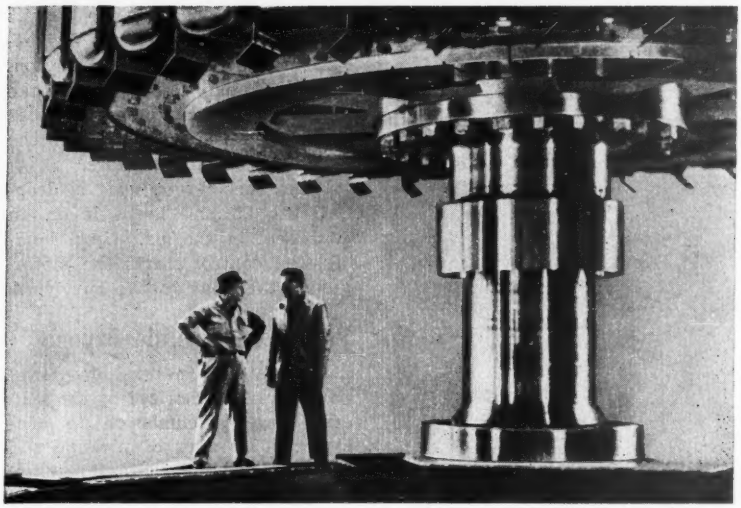
HOUGHTO-QUENCH

. . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .



MIDGETS BY COMPARISON: C. C. Watson, left, General Electric field engineer, and a Finnish power company's representative are dwarfed by the 230-ton hydraulic generator rotor built by GE in Schenectady, N. Y. and installed by the power company in Leppiniemi, Finland. A similar water-wheel generator is being built in America for installation by the same company in Imatra, Finland

U.S. Foreign Trade: A Mixed Blessing

Though foreign trade hit record highs in 1951, the U. S. must find ways around trade barriers to get defense-essential minerals from dollar-poor countries

THE UNITED STATES imported and exported more in 1951 than ever before, pointing up the growing interdependence of the U. S. with the rest of the free world. Reason for growing American dependence: Technological developments, creating uses for uncommon metals, and accelerated consumption, greatly reducing domestic reserves, have left the U. S. a "have not" nation in many important minerals.

One way for the U. S. to get the materials it needs, especially when dealing with dollar-poor, resources-rich countries, is through more "exchanges of availability" as in the recent steel for aluminum and tin deal with Britain.

Hitting the High Spots—In 1951, the U. S. exported $15 billion dollars in goods and imported $11 billion, compared with 1950 when $10.3 billion was exported and $8.9 billion was imported. The U. S. had a favorable balance of trade amounting to $4 billion in 1951 and $1.4 billion in 1950. Export figures include shipments under foreign aid programs. The December, 1951, export figure of $1,436,100 is the second highest monthly total on record; highest mark is $1,455,200 for May, 1944.

The large increase in the favorable balance of trade takes on some unfavorable aspects when it is realized that to pay for American goods in 1951 foreign countries lost some $4 billion in purchasing power. When they can't buy from us, other countries are reluctant to sell to us. Import trade by Latin America shows signs of shifting to Canada, West Germany and other European countries. Trade barriers, in the form of restrictions on imports from dollar areas, are going up in England, France, Belgium, Portugal, India and other countries.

The Hitch—Yet, the U. S. increasingly needs trade with these countries. Manly Fleischmann, Defense Production Administrator, says: " . . . out of 38 important industrial minerals, we are self-sufficient in only nine. For another 20, domestic production provides less than 60 per cent of our requirements. For seven of these 20 minerals, we are dependent on other countries for just about 100 per cent of our needs."

Domestic production of tungsten accounts for only 48 per cent of U. S. needs; of bauxite, 37 per cent of requirements; antimony, 21 per cent; cobalt, 10 per cent; manganese, 7 per cent; nickel, 1 per cent and tin, none of the U. S. requirements (STEEL, Oct. 8, p. 120). China is the largest single producer of tungsten, Bolivia of antimony, Belgian Congo of cobalt, Malaya, Indonesia and Bolivia of tin.

Up to Date — Mr. Fleischmann continues: "We cannot follow the pattern of 1941-1945. Then, the combination that built victory included a powerful, all-out drive for munitions output and the protection afforded our home front by distance. Now, we are mobilizing against a threat whose time of impact is unknown; the projection of the period of danger makes it impossible to follow the former policy . . . the raw materials balance sheet is markedly less favorable, unless we make, in co-operation with our allies, more effective and more imaginative use of our collective resources."

To get this better distribution of mineral resources, so that the U. S. may obtain the materials necessary for its defense program, Mr. Fleischmann suggests more deals like the one made with Britain for aluminum and tin. In fact, it is proposed that occasionally smaller nations be given what they need, no matter what quantity of material they contribute to the common good, if their contribution is important enough to the common defense.

Footnote to Barter

Steel men, who were critical of the steel-aluminum-tin swap with Britain, are now generally approving the agreement since it may well provide them with a market for excess steel in some forms and shapes before the end of 1952.

Japan Changes Trade Policy

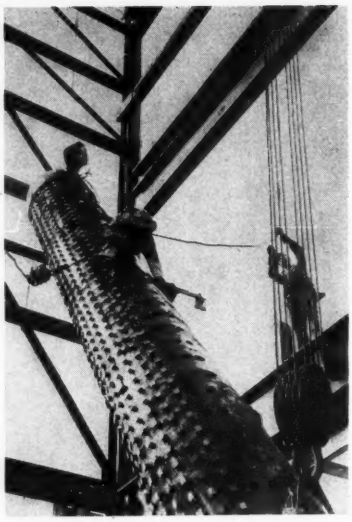
Japan announces a new trade policy of buying more and selling

less in sterling areas due to a growing backlog of sterling credits. One immediate effect will be a ban on export of 100,000 tons of Japanese steel to Britain. Japan's present pound credits total 85 to 100 million pounds, the equivalent of about $240 to $280 million.

Japan's action means that she wants the British and other sterling areas to take back some of their pounds in exchange for hard goods, which they are reluctant to do.

Quebec City To Get Furnace

A single furnace electrically-operated iron ore refinery with a capacity of 13,200 net tons of pig iron will be built in Quebec City, Que., Canada, by the end of 1953, Armand Viau, Quebec City industrial commissioner, announced. He did not disclose the sponsor of the facility, but he said that four more plants will be added eventually to bring annual capacity to 66,000 tons.



DRUMMING UP ELECTRICITY: A giant boiler drum is hoisted into position at Utah Power & Light Co.'s Hale steam-electric plant in central Utah. UP&L's five-year expansion plan, costing $68 million, will nearly double the company's generating capacity

Tool & Die Industry Blossoms on the West Coast

TOOL AND DIE shops — about 3000 of them in the country—are working on the biggest backlog of orders in their history; almost double that of a year ago and four times that of January, 1950.

Heavy defense orders on the West Coast have blossomed the tool and die industry there at a rate unmatched by even the tooling centers of Detroit, Chicago and Cleveland. There are now upwards of 300 shops in the Los Angeles area alone.

Peak Ahead—George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association, points out the peak load on the industry has not yet been reached. "This will come by mid or late 1952," says Mr. Eaton, "if the defense program is not spread out further." Even then, the pinch might well continue through 1953 as new dies and jigs are required for civilian model changes.

With the pressure on the tool and die industry, particularly on the West Coast, more productive machine tools are being asked for to make up the shortage of skilled toolmakers. Despite their high priority, tool and die men say they are being embarrassed on contract commitments by having machine tools which have been promised to them diverted to machine tool makers.

Minimum Need—It is estimated that the country needs a minimum of 20,000 additional toolmakers and 2000 of them are needed in the Los Angeles area alone. At present the methods of getting the needed workers are upgrading competent men, training men for work on a few operations only, and shortening training periods.

To assure themselves a future supply of toolmakers, the tool and die industry is backing a directive which would defer apprentices after six months of training until they had finished their apprenticeships. They would, of course, be subject later to draft.

Even Lifeboat Has Brain

Westinghouse engineers have come up with a new kind of mechanical brain—the thinking lifeboat. Designed by Westinghouse engineers from a radio transmitter-receiver set developed by the Wright Air Development Center, Wright-Patterson Air Force Base, Dayton, O., the radio control can take charge from the time the boat leaves the rescue airplane until the survivors are safe on shore.

When the 30-foot craft is dropped, the "brain" keeps it on an even keel in the air. Upon landing, the control starts the motor, guides the boat to the survivors.

Natural Gas Facilities Expand

The nation's natural gas companies were authorized by the Federal Power Commission to construct 6091 miles of pipeline and to install compressor units aggregating 426,500 horsepower at an estimated cost of over $471 million during 1951. In the last six months of 1951 alone the commission authorized 1463 miles of pipeline and other construction costing about $86.5 million. Largest single permit, totaling about $23.4 million, went to the El Paso Natural Gas Co., El Paso, Tex.

FCC Radiation Deadline: June 30

June 30 is the deadline for compliance with Federal Communications Commission radiation and communications interference regulations. Users of induction and dielectric heating equipment which was installed or manufactured prior to July 1, 1947, must certify that minimum radiation requirements have been met. The requirements were set up in FCC Rules and Regulations, Part 18, obtainable from the United States Government Printing Office, Washington.

Petroleum Firms Collect Scrap

Well over 100,000 tons of scrap metal were collected in 1951 for the nation's steel industry by the petroleum industry, Secretary of the Interior Oscar L. Chapman says. Largest contributor was Esso Standard Oil Co. with 15,315 tons. Sun Oil Co., at the request of the American Iron and Steel Institute, conducted an intensive program to serve as a "pilot plant" model for the rest of the industry and collected 8000 tons of iron and steel scrap and 70 tons of copper and brass during the last six months of 1951.

Steel Pattern Shifts

Ordnance, allied military classification increased 524 per cent over 1950 mill shipments

TWO THINGS stand out in the American Iron & Steel Institute's tally on mill shipments of finished steel in 1951: A new high record was set, and the distribution pattern shifted markedly in products and markets.

The new record was 78,928,950 net tons, an increase of 6,696,658 tons over the previous record set in 1950. This increase approximates one month's shipments at the present rate.

The shift in the distribution pattern reflects defense activities, especially in the second half of 1951.

By Leaps and Bounds—Markets receiving a large part of the additional tonnage in 1951, as compared with 1950, were largely those boomed by the defense program. Mill shipments of steel to the ordnance and other military classification increased 524 per cent; shipments to the aircraft classifications increased 524 per cent; and the shipbuilding and marine equipment group billowed 172 per cent.

Other markets, influenced in varying degrees by defense activity, which shared heavily in the increased tonnage are: Rail transportation, up 33 per cent (primarily due to the freight car program); machinery and tools, including electrical machinery, up 19 per cent; construction and contractors' products, up 8 per cent; oil and gas drilling, up 34 per cent; and forgings (other than automotive), up 42 per cent.

Pinched — Reflecting the pinch the defense program put on civilian products, the automotive classification (including automotive forgings) received 11 per cent less steel from mills in 1951 than in 1950, and the reduction to the makers of appliances, utensils and cutlery was 12 per cent.

Among the products there was a shift from light to heavy steel, another result of the defense program. Shipments of plates, bars, structural and semifinished increased substantially in 1951 over 1950. Galvanized sheets and tin plate shipments declined.

Steel Shipments Bear Imprint of Defense Activities

MARKET CLASSIFICATIONS	SHIPMENTS NET TONS	—CHANGE FROM 1950— TONS	PER CENT
Steel for Converting & Processing	4,237,097*	+ 293,853	+ 7
Forgings (Other than Automotive)	1,552,211	+ 462,119	+ 42
Bolts, Nuts, Rivets and Screws	1,602,215	+ 195,051	+ 14
Jobbers (Including Oil and Gas)	14,386,587	+1,004,157	+ 8
Construction and Contractors Products	12,687,021	+ 992,374	+ 8
Automotive (Including Automotive Forgings)	12,976,532	−1,559,806	− 11
Rail Transportation	5,782,173	+1,450,902	+ 33
Shipbuilding and Marine Equipment	888,679	+ 561,566	+172
Aircraft	148,684	+ 97,583	+190
Oil and Gas Drilling	837,788	+ 214,680	+ 34
Mining, Quarrying and Lumbering	371,031	+ 80,324	+ 28
Agricultural	1,647,266	+ 107,677	+ 11
Machinery & Tools, Including Elec. Machinery	6,265,958	+1,021,446	+ 19
Appliances, Utensils and Cutlery	1,834,659	− 253,590	− 12
Other Domestic and Commercial Equipment	2,028,869	+ 219,079	+ 12
Containers	6,500,379	+ 590,827	+ 10
Ordnance and Other Military	1,213,657	+1,019,196	+524
Exports	2,775,917	+ 245,656	+ 10
Shipments of Non-Reporting Companies	1,192,227	− 46,436	− 4
TOTAL	78,928,950	+6,696,658	+ 9

* Net total after deducting shipments for conversion or resale.

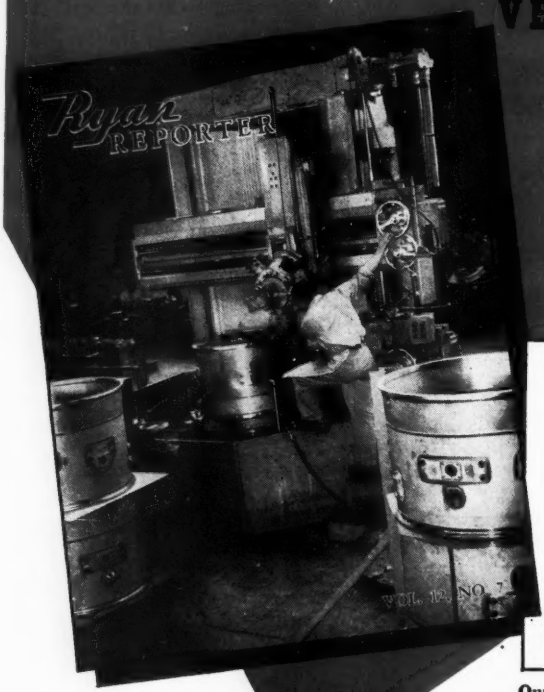
Distribution Shows Shift to Heavier Products

PRODUCTS	NET TONS Carbon	Alloy	Stainless	Total	Per cent of Total Shipments
Ingots	1,049,827	246,698	19,321	1,315,846	1.7
Blooms, slabs, billets, tube rounds, sheet bars, etc.	1,645,483	575,897	18,367	2,239,747	2.8
Skelp	152,474	.....	.....	152,474	0.2
Wire rods	826,267	16,121	4,981	847,369	1.1
Structural shapes (heavy)	4,858,678	63,219	73	4,921,970	6.2
Steel piling	399,073	.....	.....	399,073	0.5
Plates	7,499,321	393,219	18,054	7,910,594	10.0
Rails—Standard (over 60 lbs.)	1,698,880	162	.....	1,699,042	2.2
Rails—All other	120,662	53	.....	120,715	0.2
Joint bars	132,173	.....	.....	132,173	0.2
Tie plates	445,932	.....	.....	445,932	0.6
Track spikes	158,406	.....	.....	158,406	0.2
Wheels (rolled & forged)	396,383	178	.....	396,561	0.5
Axles	220,402	695	.....	221,097	0.3
Bars—Hot rolled (incl. light shapes)	6,603,655	2,284,040	42,938	8,930,633	11.3
Bars—Reinforcing	1,900,125	.....	.....	1,900,125	2.4
Bars—Cold-finished	1,556,740	337,351	41,732	1,935,823	2.5
Tool Steel	33,658	137,398	.....	171,056	0.2
Standard pipe	2,931,831	1,421	69	2,933,321	3.7
Oil country goods	1,685,809	193,407	.....	1,879,216	2.4
Line pipe	3,185,944	894	.....	3,186,838	4.0
Mechanical tubing	674,891	298,896	6,279	980,066	1.2
Pressure tubing	295,243	27,009	10,178	332,430	0.4
Wire—Drawn	3,136,657	51,699	31,473	3,219,829	4.1
Wire—Nails & staples	864,803	.....	30	864,833	1.1
Wire—Barbed & twisted	237,804	.....	1	237,805	0.3
Wire—Woven wire fence	416,704	.....	.....	416,704	0.5
Wire—Bale ties	110,407	.....	.....	110,407	0.1
Black plate	1,076,296	.....	.....	1,076,296	1.4
Tin & terne plate—hot-dipped	1,628,562	.....	.....	1,628,562	2.1
Tin plate—Electrolytic	2,887,129	.....	.....	2,887,129	3.7
Sheets—Hot-rolled	7,837,486	294,662	38,585	8,170,733	10.3
Sheets—Cold-rolled	9,421,051	111,846	108,063	9,640,960	12.2
Sheets—Galvanized	1,984,054	907	.....	1,984,961	2.5
Sheets—All other coated	257,195	.....	.....	257,195	0.3
Sheets—Enameling	182,187	.....	.....	182,187	0.2
Electrical sheets & strip	134,524	623,337	.....	757,861	1.0
Strip—Hot-rolled	2,160,726	38,176	8,076	2,206,978	2.8
Strip—Cold-rolled	1,856,055	28,658	191,290	2,076,003	2.6
TOTAL	72,663,497	5,725,943	539,510	78,928,950	100.0

Ryan's photogenic BULLARD CUTMASTER VERTICAL TURRET LATHE

Once again the Reporter has selected this machine as a highlight.

It previously appeared in Vol. 12 No. 2 March 15, 1951 issue of the Reporter



VOL. 12 NOV. 1, 1951 No. 7

Published By
Ryan Aeronautical Company
Lindbergh Field
San Diego 12, California

Frances L. Kohl, art and production editor
William P. Brotherton, technical editor
Harold Keen, associate editor
Robert F. Smith, Navion news editor
Don Doerr, chief photographer
William Wagner, editorial director

D-17 flanges are precision turned on vertical turret lathe. This exhaust cone converts G-E J-47 turbojet into afterburner version with added kick.

ON THE COVER

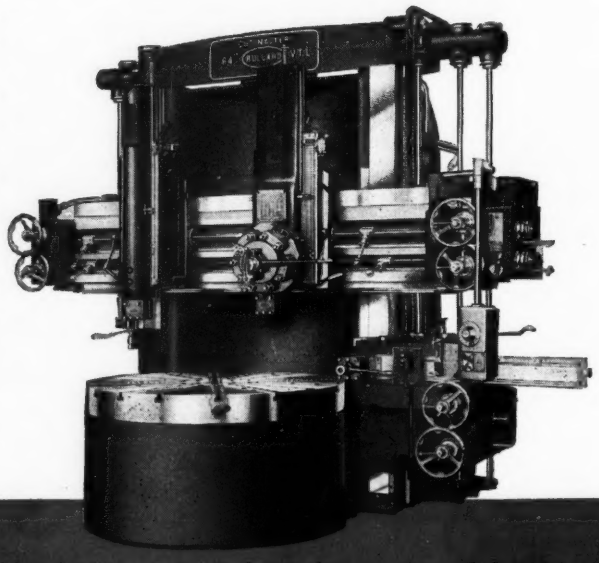
Our Sincere Thanks to those who have recognized our efforts to Produce a Machine Tool for Manufacturing to the Highest Standards.

In Bullard Machines is incorporated the Engineering Experience of the past and the knowledge of present requirements. This, naturally, results in Engineering Design for the Utmost in manufacturing Accuracy, Production and Economy of Operation.

Ryan Aeronautical Company in using illustrations of machinery in their plant signify the pride and faith they place in their selection of outstanding manufacturing equipment.

Bullard Engineering Service is available to assist YOU with manufacturing problems. Call on this Service and Know more about the Bullard Line of Machine Tools as applied to your work.

Write for Complete Information



THE BULLARD COMPANY BRIDGEPORT 2, CONN.

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Army Ordnance is being panned for both its procurement and production policies. Especially criticized is the "packaging nightmare"

DETROIT

ARMY ORDNANCE is on the pan and the fire underneath is being fanned from several directions.

One indictment of its procurement operations has been penned by Samuel S. Willis, a manufacturers' agent in Detroit, who gave testimony before the government operations subcommittee of the Committee on Expenditures in the Executive Departments, more popularly known as the Hardy Subcommittee, when this group held hearings in Detroit last December.

What's Wrong — His follow-up to this testimony takes the form of a 76-page "memorandum" entitled "What's Wrong with Ordnance Buying," a recounting of the snafus and policies which he believes are responsible for many companies wanting no part in manufacturing for the government. A fundamental fault he finds with government procurement, particularly as applying to the Ordnance Department, is that none of industry's conventional practices is followed.

It makes no difference, says Mr. Willis, that a company has demonstrated its ability to produce a satisfactory item for the military —each new contract is let without regard to past performance. Any manufacturer who goes into a contract with the government with the idea that it is a bilateral agreement is due for a big surprise. Dealing with the government, Mr. Willis avers, is a case of "let the seller beware." Ordnance policy, he states, is to give no help, make available no materials, and in general do nothing to co-operate with the manufacturer when he's in a tight spot. Two especially deep pitfalls which can permanently sink a manufacturer come in for his castigation. His terms for these are the "excise tax trap" and the "packaging nightmare."

Sleeper—On the first of these, he says many manufacturers who contemplate dealing with Ordnance have no idea that the federal manufacturers' excise tax is charged on sales to the government. Now 8 per cent on all automotive parts, that tax should be included as a cost item when preparing a bid. But he asks: How many bidders know whether a part is to be used in an automotive vehicle where the tax must be paid or in a combat vehicle where it is not paid?

The packaging nightmare can lead to an even worse fiasco for the manufacturer. Many plants acting as "feeders" for the automotive industry have virtually no packaging to do. Their components are often shipped in bulk, in steel boxes or drums or even burlap bags. Ordnance's specifications relating to packaging are so complex as to almost defy description. Delving into the packaging problem, Mr. Willis discovered that the regulations and specifications relating to packaging of the government contracts held by his principals were contained in 60 separate pamphlets. On one bid invitation for universal joints, the quotations ranged from 8 cents each to 32 cents each, the difference in manufacturers' prices resulting wholly from the difference in packaging.

Suggestions — To remedy the faults, Mr. Willis recommends:

1. Appoint an experienced civilian executive director of purchases with full responsibility for purchase of automotive vehicles and parts by the Ordnance Tank Automotive Center, and answerable to the Commanding General; 2. Set up several completely integrated purchasing divisions at the center with the responsibility and authority to perform every step involved in purchasing a given group of items; 3. Set up contract administration divisions organized on the same pattern; 4. Simplify contract forms, this work to be done by a joint committee of lawyers from the Chief of Army Ordnance's office and the American Bar Association; 5. Exempt all defense contractors from the excise tax, make the Army pay the tax directly to the Internal Revenue Department;

PROGRESS ON WHEELS: From the Conestoga wagon to the Champion, Studebaker has been manufacturing highway vehicles for 100 years. In that time, the company has produced 7,130,874 horse and horseless carriages. Harold S. Vance, board chairman and president, drove this 1952 Champion sedan off the assembly line 100 years and two days after the Studebaker brothers opened their original wagon-building and blacksmith shop at South Bend, Ind.

(Material in this department is protected by copyright and its use in any form without permission is prohibited)

6. Conduct a comprehensive study of the renegotiation acts; 7. Simplify method of small purchases, possibly through simple request for quotation and purchase order forms; 8. Investigate into the "extra consideration" directive which makes mandatory reduction in the contractor's price for all help given by the government in the way of tools, materials, etc.; 9. Set up centralized Army inspection and packaging centers to which manufacturers can ship their products and thus be relieved of the "packaging nightmare" and the lag between inspection and acceptance.

On the Fire—Ordnance is on the defensive also as far as its manufacturing operations are concerned. Criticism has centered around the as yet unconquered bugs which got into tanks when they went directly from drawing board to assembly line without some of the customary time-consuming inbetween steps. One of the controversial vehicles, still unnamed, is the T-47 tank being produced at the Detroit Tank Arsenal.

That is the only vehicle currently in production at the arsenal. All development work for ordnance vehicles, however, is done in the facility and pilot models are produced. Additionally the plant's equipment is used for manufacture of replacement parts for vehicles which are no longer in production.

Ordnance is making an intense effort to counteract the bad publicity it has had from the malfunction of components in several of its newly developed vehicles. It is anxious to show nonsecret developments in the way of tooling and manufacturing methods as applied to military products. A broaching machine, designed by Colonial Broach Co., Detroit, to cut the teeth in the tank turret ring gear is one such development. Used instead of a gear shaper, this unique machine cuts eleven teeth at each pass of the broach.

Co-operation on Auto Stampings

More than 1000 steel stampings are in an automobile. For that reason the factors involved in die design, body and tool engineering are of utmost importance to a large segment of the metalworking industry which supplies automakers. The strong appeal of the subject was evidenced Monday when three authorities in their fields addressed the Detroit section of the Society of Automotive Engineers with a standing-room-only crowd.

Agreed—The three men—A. R. Lindsay, chief engineer, Automotive Division, Budd Co., C. R. Cory, assistant director, die engineering, General Motors Corp.'s Fisher Body Division, and A. J. Hole, general manager, metal stamping division, Ford Motor Co.—are in agreement on one subject: Great co-operation is needed between body designers, die engineers and process engineers.

Auto, Truck Output
—U. S. and Canada

	1952	1951
January	418,486*	645,688
February		658,918
March		802,737
April		680,281
May		695,898
June		653,682
July		522,858
August		571,442
September		505,758
October		558,971
November		480,199
December		404,547
Total		7,180,979

Week Ended	1952	1951
Jan. 26	94,722	167,913
Feb. 2	102,402	150,984
Feb. 9	102,406	116,071
Feb. 16	107,618	178,141
Feb. 23	109,000*	199,247

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Progress in this direction was reported by Mr. Lindsay who said that since the war a better understanding of each others' problems has contributed to the shortening of time required for model changeover. This would seem to be one answer management will have ready when Walter Reuther presses his demand for a guaranteed annual wage for automakers.

Savings—Citing the difficulties involved in many drawing operations where sharp corners and deep valleys occur, Mr. Cory also explained some of the other considerations of the die designer—cutting down blank size, making best use of steel, striving to change parts so cheaper commercial grades of steel will work. Mr. Hole said Ford saves on steel extra charges by slitting its own strip and is contemplating wider use of cutoff operations. Ford minimizes age hardening of steel in inventory by rotating stock.

Not mentioned by any of the speakers was the troublesome experience Ford had in several of the stampings required for 1952 models. Rear quarter panel for the Lincoln, it is understood, had 100 per cent scrap loss because of the deepness of the draw until the right drawing compound was specified. Other makers have had similar experiences because of the intricacy of many of the parts now necessary to meet the body stylists' concepts. Some of the blame for the difficulties is passed on to the steelmakers, and both Mr. Hole and Mr. Cory commented about the problems encountered because of steel quality presently. The automotive industry as a whole was never more concerned about quality than it is now. A strong public sentiment exists that cars are suffering because of substitutions, and the industry is determined to make the limited number of cars it is permitted to turn out the best it has ever built. For this reason many scratches resulting from the draw dies and other blemishes which in 1950 and 1951 would have been covered up with paint in the interest of getting production out are now cause for rejection.

Compatible—Getting top quality and holding costs down are not incompatible, said Mr. Cory, but he and Mr. Hole admitted that automation as applied to die operation poses new problems. Mr. Hole added that any bad conditions in die design or steel quality are magnified by present high-speed presses and automatic loading and unloading devices.

Automation is more than ever the by-word of automakers. DeSoto's V-8 engine plant in Dearborn six months ago was the latest thing in automaticity. It contained an unrivalled assortment of transfer machines.

Today Ford's engine plant in Cleveland probably deserves the crown for the most nearly automatic operation of its kind. But it's only a matter of time and the conveyor and tool designer's ingenuity before that plant will take a back seat. Automaticity, however, isn't achieved easily.

The Symbol of Quality

ARISTOLOY STEELS

in

ELECTRIC FURNACE STEELS

STANDARD STRUCTURAL ALLOY • BEARING QUALITY • ALLOY TOOL • SPECIALTY • NITRALLOY • CARBON TOOL • MAGNAFLUX-AIRCRAFT QUALITY

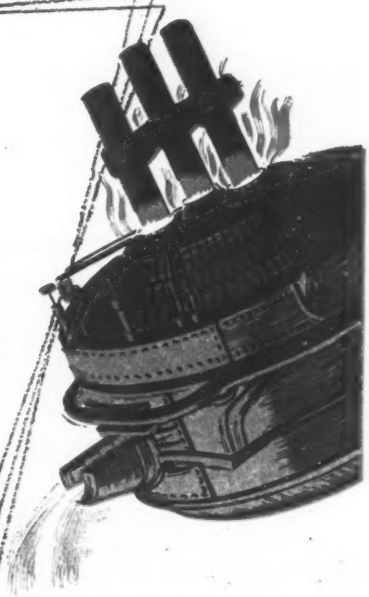
Hot Rolled • Forged • Annealed • Heat Treated • Normalized
Straightened • Cold Drawn • Machine Turned • Centerless Ground

COPPERWELD STEEL COMPANY
WARREN, OHIO

117 Liberty Street New York, New York	1578 Union Commerce Bldg. Cleveland, Ohio	528 Fisher Building Detroit, Michigan
176 W. Adams Street Chicago, Illinois	7251 General Motors Bldg. Detroit, Michigan	3104 Smith Tower Seattle, Washington
P. O. Box 1633 Tulsa, Oklahoma	325 W. 17th Street Los Angeles 15, Calif.	Monadnock Building San Francisco 5, Calif.
	1140 Lockwood Drive Houston 20, Texas	803 Loew Building Syracuse, New York

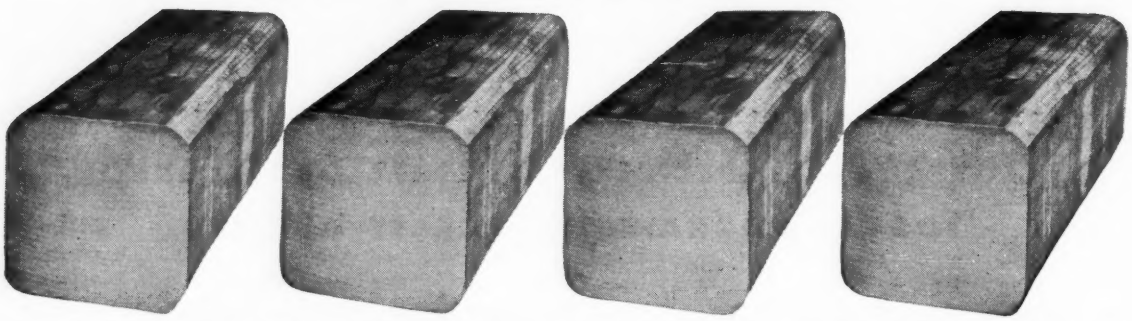
sell your scrap

IT'S BETTER TO USE THE BEST!



To get uniform forgings here...

start with uniform TIMKEN® forging steels!



YOU can get uniform, high quality forgings and cut production costs too if you start by using uniform, high quality Timken® forging steels. With Timken forging steels, you're assured of uniform forgeability, uniform response to heat treatment, uniform machinability—from bar to bar and heat to heat. As a result, you have fewer rejects, fewer delays, fewer changes in shop practice.

The uniformity of Timken forging steels is the result of rigid quality control from melt shop through final inspection. For example, the Timken Company uses the direct reading spectrometer—first in the industry—to make possible instantaneous control and checking of every heat before it's tapped.

To learn how you can improve the quality of your forgings, cut production costs or both—get an "on-the-job" analysis by our Technical Staff. And for our bulletin No. 31, "Chemical Composition of Alloy Steels", write on your company letterhead to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

Theory that this year's business will resemble 1951 in reverse is supported by spotty conditions that follow pattern established in last year's second half

PREDICTIONS that this year's business will resemble 1951 in reverse are worth a second look, because present trends are following that pattern in many ways.

The theory is that the economic plateau of last year's second half will be duplicated in this year's January-June period. That would indicate generally steady business this spring—with perhaps a mild downturn before midyear. The second half would turn into a mad production scramble akin to that of 1951's first half.

Tempering Influence—This view must be tempered by basic objectives of the defense program and their influence on production patterns. Essence of the present program is to provide means to produce weapons; the weapons themselves are of secondary importance now.

Once the base of arms-producing potential is broadened there will be no great outpouring of arms for stockpiles after immediate needs are met. The volume contemplated doesn't compare with that of World War II.

The Effect—This means several things to businessmen. One is that odds are against long-term restrictions on civilian production. Thus there will be no great deferred demand for civilian products such as was found in 1946.

Capital expenditures to build plants and buy equipment are the heart of the defense boom. After downturn of the capital expansion program (it's expected to ebb gradually after this year), a business shakeout is a probability.

Index Edges Up . . .

Current activity in industrial production is spotty, but the components of STEEL's index add up to a rise in total output. In the week ended Feb. 16. STEEL's industrial production index registered 213 per cent of the 1936-1939 average, up 3 points from the downward-revised final mark of the week before.

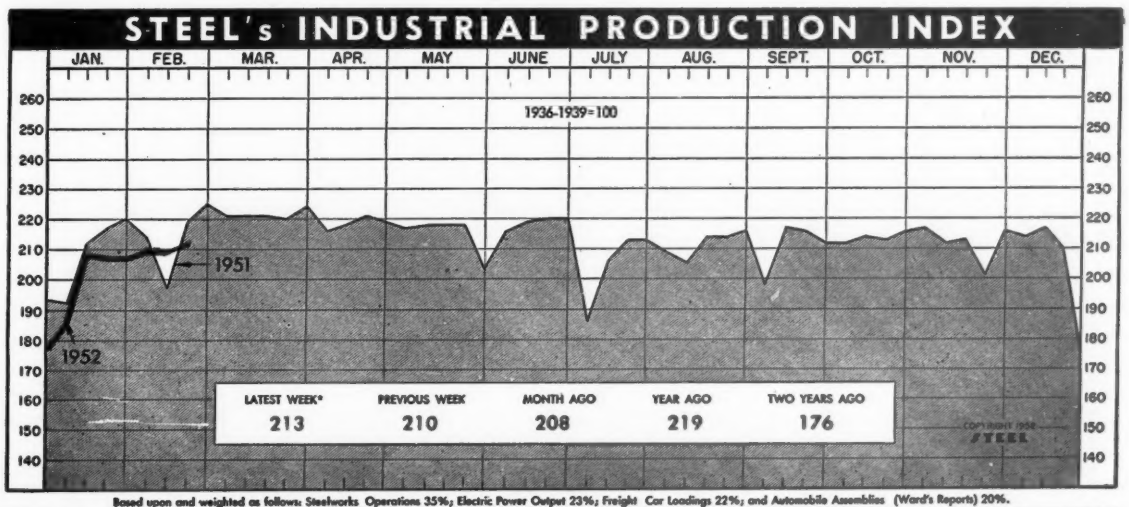
Acceleration Slowed . . .

In figuring 1952 business as 1951 in reverse, note that economic activity during 1951 increased—but at a decreasing rate. Quarterly increases last year, at annual rates, amounted to $15 billion and $9 billion in the first half and averaged only $3 billion per quarter in the second half.

These differential rates reflect a slower expansion of volume as well as stabilization of prices after the first quarter. Total gross national product for the year was $328 billion, which compares with $283 billion in 1950. About half of this 16 per cent rise came from higher prices and half from expansion in physical output.

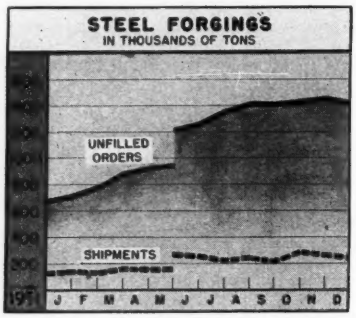
Slackening in the growth of total production was due mainly to a leveling off in consumer purchases and reduction in business buying. Result was a slowing down in growth of business inventories. Personal consumption expenditures rose 6 per cent to $205.5 billion in 1951, but the gain was accounted for entirely by higher prices. Of this total, durable goods purchases ($25 billion) were $2.5 billion less than in 1950, and nondurables buying at $112 billion was little changed in real terms. Outlays for services ($67 billion in 1951) were up $5 billion, a rise in volume as well as price.

Gross private domestic investment increased 20 per cent over 1950 to $59 billion. Capital equipment expenditures and industrial construction rose to $39 billion—



Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

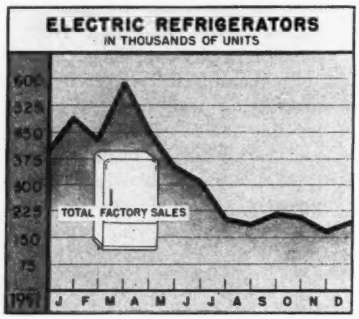
* Week ended Feb. 16



Steel Forgings
Thousands of Net Tons

	Shipments		Backlogs	
	1951	1950	1951	1950
Jan.	138	93	709	327
Feb.	129	93	781	341
Mar.	161	109	875	350
Apr.	154	99	924	357
May	266*	114	1,208*	373
June	249*	117	1,264*	408
July	220*	95	1,361*	446
Aug.	240*	124	1,436*	548
Sept.	225*	122	1,419*	620
Oct.	280*	137	1,427*	643
Nov.	256*	130	1,446*	657
Dec.	232*	128	1,411*	674

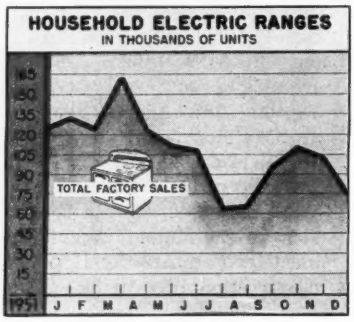
U. S. Bureau of the Census. *Data for these months based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more. Previous data based on reports from commercial forge shops producing 3600 tons or more per year.



Electric Refrigerators
Total Factory Sales—Units

	1951	1950	1949
Jan.	488,607	375,856	396,329
Feb.	423,420	461,256	348,539
Mar.	591,449	586,293	382,861
Apr.	445,636	546,279	335,092
May	348,423	542,865	341,933
June	309,125	549,740	310,780
July	199,616	507,029	327,429
Aug.	187,603	518,359	314,839
Sept.	215,459	535,002	326,149
Oct.	209,263	420,431	265,575
Nov.	167,217	411,201	230,258
Dec.	195,403	394,268	272,636
Total	3,797,260	5,848,579	3,852,420

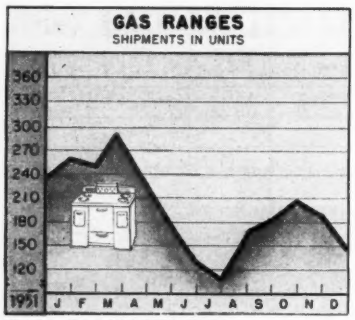
National Electrical Mfrs. Assoc.



Household Electric Ranges
Total Factory Sales—Units

	1951	1950	1949
Jan.	132,437	97,925	109,919
Feb.	123,953	118,989	88,333
Mar.	162,267	145,417	88,934
Apr.	122,803	132,859	60,739
May	109,572	145,498	52,881
June	107,861	158,534	69,107
July	62,713	130,505	63,249
Aug.	64,874	132,243	66,753
Sept.	96,182	156,216	93,045
Oct.	110,203	130,452	73,312
Nov.	103,238	129,384	60,523
Dec.	73,241	124,360	77,011
Total	1,269,509	1,602,382	903,806

National Electrical Mfrs. Assoc.



Gas Ranges
Shipments in Units

	1952	1951	1950
Jan.	153,600	260,600	165,000
Feb.	.....	254,000	209,000
Mar.	.....	289,800	264,000
Apr.	.....	225,000	239,100
May	.....	177,800	242,800
June	.....	128,500	217,000
July	.....	116,400	254,800
Aug.	.....	168,100	331,500
Sept.	.....	183,600	287,000
Oct.	.....	210,900	308,000
Nov.	.....	192,200	269,100
Dec.	.....	145,800	235,900
Total	.....	2,348,900	3,023,200

Gas Appliance Mfrs. Assoc.

Charts—Copyright 1952, STEEL

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Feb.11	Gear Sales Feb.11	Prices Feb.18
Durable Goods Feb.4	Gray Iron Castings..Dec.31	Radio, TV Jan.21
Employ., Metalwkg..Jan.28	Ironers Jan.21	Steel Castings Dec.31
Employ., Steel Jan.28	Indus. Production...Feb.18	Steel Shipments Dec.17
Fab. Struc. Steel...Feb.4	Malleable Castings..Dec.31	Vacuum Cleaners...Feb.4
Foundry Equip. Feb.18	Machine Tools Feb.11	Wages, Metalwkg...Jan.28
Freight Cars Jan.28	umps Dec.10	Washers Jan.14
Furnaces, Indus. ...Feb.18	Purchasing Power ..Feb.4	Water Heaters Feb.11

a $7 billion increase. Foreign investment showed a small positive balance for 1951 and exports rose more rapidly than imports. Government purchases of goods and services rose from $42.5 billion in 1950 to $63 billion in 1951. Defense spending moved from $15 billion in 1950 to $34 billion in 1951 and a $41 billion annual rate in the fourth quarter.

Auto Demand Promising . . .

With new car demand promising, automakers are going all out to achieve unit production allowed by NPA. Field demand, says *Ward's Automotive Reports,* admittedly is not running away with production in all makes and models. But in the low-price field particularly no buildup in dealer stocks is indicated. Production is becoming more stabilized too. In the week ended Feb. 16, automakers scored their third straight production increase. This push, says *Ward's,* was still not strong enough to lodge assemblies into the 1,006,000-unit quarterly rate. *Ward's* latest output figures for U. S. and Canadian plants showed 107,618 cars and trucks were produced—up more than 5000 units in one week.

No Dent in Output . . .

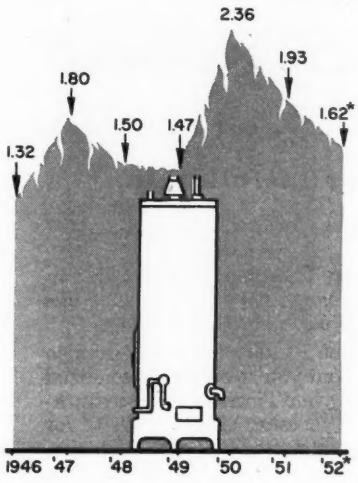
Until the wage issue comes to a head, scrap must be regarded as the chief threat to steel mill operations. Shortages so far this winter haven't dented output appreciably; in fact, a new production record was established in January when 9,120,000 tons of raw steel were turned out. Mill operations were scheduled to speed up in the week ended Feb. 23, says American Iron & Steel Institute. It calculates output at 2,090,000 net tons of ingots and castings steel, up 11,000 tons from the week preceding.

Beating the Deadline . . .

Builders are trying to get work under way before the government clamps new restrictions on residential construction. That is mirrored in the 10 per cent increase in new housing starts in January. Private homebuilding rose 6 per cent to 64,800 units while public housing starts moved from 1100 in December to 3200 in the bad-

The Flame Flickers

Automatic Gas Water Heaters
(annual production, millions of units)



* Estimated. Source: Gas Appliance Mfrs. Assoc.

weather month of January, says the Labor Department. A 25 per cent increase in the number of new units authorized (by building permits) indicates a further housing boost in February.

Business Departure . . .

Business may be departing from the downward trend established in the early fall of 1951, says Purchasing Agents of Chicago after a survey of members. Buyers indicate that slide in production and backlogs was reversed in January. A tendency toward stabilization is seen in faster deliveries and a few more lower prices. Signs indicate that supply is catching up with demand. When asked whether they could sell all they produce, 60 per cent of the purchasing men said "yes" and 40 per cent "no."

Trends Fore and Aft . . .

Wholesale prices are now nearly 5 per cent below year-ago marks . . . U. S. corporations paid out a record $8,053,000,000 in cash dividends in 1951, says the Commerce Department. Increased payments were reported in all fields except manufacturing, which was off 3 per cent from 1950 . . . New order bookings for pumps at yearend was lowest in over a year; the decline started in July . . . Shipments of automatic gas water heaters and gas ranges moved up in January, but gas-fired furnace, boiler and conversion burner shipments slackened . . . Lifting the freeze on new television stations will mean a spurt in demand for home receivers . . . Edison Electric Institute forecasts that the country will use one-third more electric power in 1954 than it used last year.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	100.0	100.0	99.0
Electric Power Distributed (million kwhr)	7,440	7,456	6,905
Bituminous Coal Output (daily av.—1000 tons)	1,764	1,738	1,408
Petroleum Production (daily av.—1000 bbl)	6,340[1]	6,363	5,936
Construction Volume (ENR—millions)	$233.5	$167.1	$256.5
Automobile, Truck Output (Ward's—units)	107,618	102,406	178,141
TRADE			
Freight Car Loadings (unit—1000 cars)	740[1]	734	741
Business Failures (Dun & Bradstreet, number)	125	134	165
Currency in Circulation (millions)[3]	$28,425	$28,378	$27,159
Dept. Store Sales (changes from year ago)[3]	−8%	+4%	+18%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$13,046	$17,455	$13,338
Federal Gross Debt (billions)	$260.1	$259.8	$256.1
Bond Volume, NYSE (millions)	$10.5	$12.9	$18.4
Stocks Sales, NYSE (thousands of shares)	5,370	7,531	8,836
Loans and Investments (billions)[4]	$73.7	$74.0	$69.2
United States Gov't. Obligations Held (billions)[4]	$32.4	$32.4	$31.1
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92[1]	171.92[1]	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	243.6	262.3
All Commodities[7]	175.2	175.8	183.9
Metals and Metal Products[7]	193.4	192.9	188.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1926=100.

A. I. S. I.

4130

Government Specification
AN-QQS-685
CONDITION "N"

CHROME-MOLY STEEL
AIRCRAFT QUALITY

Earmarked stocks for aircraft or guided missiles.

Standard Size Sheets .025" to ½" thick

Some lighter gauges can be furnished in coils.

Certification only

THE Kenilworth Steel co.
750 BOULEVARD
KENILWORTH, N. J.

SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

Telephones: N. Y. COrtlandt 7-2427
N. J. UNionville 2-6900
Teletype: Roselle, N. J., 387

MEYER FURNACE PROVES *Speed Nuts*®

✓ step up production ✓ cut reject rate
✓ simplify dealer installation

Those are three mighty important advantages to any manufacturer — especially today. The Meyer Furnace Company, Peoria, Illinois, did it by using only 24 SPEED NUTS on their Oil-Fired B Series Furnace. *Reports reveal a savings of 15 minutes assembly time per unit and a 25% reduction in the reject rate.*

The third advantage is highly important to a furnace manufacturer. Anything he can do to make the dealer's installation job easier and quicker means a tremendous premium in improved dealer relations. Meyer accomplished this by changing from fixed, welded bolts to SPEED GRIPS* for attaching the pressure oil burner. This change in installation *eliminated dealer complaints on time wasted due to misalignment of bolts and burner flange.*

This is a good time to look for little ways to save big dollars. And you're sure of specialized help—supplied by your Tinnerman representative. Call in this "fastener expert". Write for your copy of "Savings Stories" case histories. TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Ltd., Hamilton. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S.A.—7 rue Henri Barbusse, Levallois (Seine) France.

Detail sketch shows location of 4 bolts retained by 4 SPEED GRIPS. Flange of oil burner placed over SPEED GRIPS. Bolts through flange are easily aligned due to "float" provided by SPEED GRIPS. No need to bend bolts and damage threads. Burner is easily installed, easily serviced.
TINNERMAN Speed Nuts®
FASTEST THING IN FASTENINGS®

Men of Industry

PAUL W. RHAME
. . . gen. mgr., GM Rochester division

CLINTON F. ROBINSON
. . . new president of Carborundum

FOSTER W. LAMB
. . . Automatic Transportation gen. sales mgr.

Paul W. Rhame was appointed general manager, Rochester, N. Y., Products Division, **General Motors Corp.** Formerly plant manager for the AC Spark Plug Division at Milwaukee, Mr. Rhame succeeds **Ralph B. Knight,** who is on special assignments until retirement in June.

Stephen A. Keller was named general manager, valve division, **Minneapolis-Honeywell Regulator Co.,** Minneapolis. He succeeds **James H. Binger,** who continues as vice president of the division. **Howard MacDonald,** chief industrial engineer, succeeds Mr. Keller as division plant superintendent. **R. W. Devenport** succeeds Mr. MacDonald.

Thomas L. Blose joined **A. O. Smith Corp.** of Texas as chief engineer at its Houston pipe mill. He was at the Spang-Chalfant seamless tube mill of National Supply Co. at Ambridge, Pa.

Noble B. Clark was appointed to the newly created post of sales manager of the machine tool division, **Warner & Swasey Co.,** Cleveland. He was manager of foreign sales and continues that duty. At present he is on loan to the government on a special three-month mission in Japan for the NPA. He will return to Cleveland and his new post shortly.

Dr. J. H. Moses was appointed chief geologist, **Reynolds Mining Corp.,** Richmond, Va., subsidiary of Reynolds Metals Co. He succeeds the late **Dr. Carl Schmedeman.**

Carborundum Co., Niagara Falls, N. Y., elected **Clifton F. Robinson** president and director. He succeeds **H. K. Clark,** who resigns as president but remains a director of the company. **Paul B. Brown, Clarence E. Hawke** and **William H. Wendel,** formerly managers of the bonded products and grain division, refractories division, and coated products division, respectively, were elected vice presidents in charge of their divisions.

O. E. Guibert Jr., vice president, **Guibert Steel Co.,** Pittsburgh, was appointed general manager of the company.

Harry C. Barnes was appointed division superintendent, hot and cold strip mills, Midland Works, **Crucible Steel Co. of America,** Pittsburgh. He was formerly with Inland Steel Co.

J. A. Gundel was appointed sales manager, machinery division, **Airtherm Mfg. Co.,** St. Louis. He succeeds **Mark W. Drehmer.**

John T. Weber was named manager, sales development, **Cummins Engine Co. Inc.,** Columbus, Ind. He succeeds **Howard P. Sharp,** resigned.

Sigurd Sundeen, treasurer, **Austin Metal Products Inc.,** Detroit, was elected to the combined post of president and treasurer to succeed **Wilbert L. Austin,** resigned. **Leonard V. Pylkas** was named vice president and **George Foresz** was re-elected secretary.

Foster W. Lamb was appointed general sales manager, **Automatic Transportation Co.,** Chicago. For the last two years he was product sales manager, Buda Co., and previously held executive positions with Allegheny Ludlum Steel Corp., Jones & Laughlin Steel Corp., Colorado Fuel & Iron Corp. and Templeton, Kenly & Co.

A. B. Hennessy Jr. was appointed Chicago district sales manager, **Summerill Tubing Co.,** division of Columbia Steel & Shafting Co.

Lamson Corp., Syracuse, N. Y., appointed **Angus M. Brown** manager-commercial sales. He was with Divine Bros., Utica, N. Y.

J. R. Lewis was appointed general sales manager, **Quaker Rubber Corp.,** division of H. K. Porter Co. Inc., Philadelphia. With Quaker more than 11 years, he most recently was assistant general sales manager.

Diamond Chain Co. Inc., Indianapolis, appointed **D. G. Viskniskki** Chicago district manager to succeed **S. C. Hurley,** retired.

Watson-Stillman Co., Roselle, N. J., announces changes in its executive positions. **R. S. Sweeney,** vice president-treasurer, was elected a director. **J. W. West Jr.,** a director, was appointed assistant to the president. **A. B. Diss** becomes vice president-manufacturing; **R. W. Dinzl** is consulting engineer; **Adolph deMatteo,** chief engineer; **R. W. Schreck,** general manager-

sales, hydraulic division; **Jackson Kemper,** general manager-sales, distributor products division; **H. E. Elliott,** sales manager, hydraulic division; **J. P. Bittenbinder,** sales manager, distributor products division.

Joseph D. Walker, acting manager of advertising, **Tennessee Coal & Iron Division,** United States Steel Co., Birmingham, was made advertising manager.

Dr. Fred Clsen was appointed vice president for research and development of **Olin Industries Inc.,** New York.

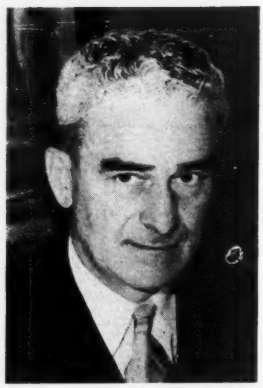
Dr. Claude L. Benner, president, Continental American Life Insurance Co., Wilmington, Del., was recently elected a director of **Eastern Stainless Steel Corp.,** Baltimore.

Bruce K. Stabelfeldt joined the creative staff of **Waldie & Briggs Inc.,** Chicago. Until recently he was sales promotion and advertising manager, Edward Valves Inc.

Morton Machine Works, Ferndale, Mich., appointed **Howard C. Carlson** general office manager. Mr. Carlson formerly was general manager, Ramsey Electric Co.

Virgil P. Burgess was appointed controller and acting secretary-treasurer, **Morse Chain Co.,** Detroit, a division of Borg-Warner Corp.

Robert M. McCabe, affiliated with **Vickers Inc.,** Detroit, since 1934, was elected vice president in charge of purchasing. He has been general purchasing agent.



J. R. STEELMAN
. . . president of Koehring

E. A. BRUGGER
. . . Koehring V. P.-general manager

J. R. Steelman was elected president and **E. A. Brugger,** vice president and general manager, **Koehring Co.,** Milwaukee. In his new post Mr. Steelman succeeds **G. E. Long,** now chairman of the board, a position he held dually with the presidency. Mr. Steelman also becomes president of each of Koehring's four subsidiary companies. Mr. Brugger has been vice president-production.

Kenneth L. Matthews, former manager, estimating department, **Ingalls Iron Works Co.,** Birmingham, was appointed district sales engineer with headquarters in Chicago.

Joseph A. Grazier was elected executive vice president, **American Radiator & Standard Sanitary Corp.,** Pittsburgh. He also was named to the firm's board of directors and its executive committee. He succeeds the late **J. Phillips Cosgrove** in all three positions. Previously vice president and secretary, he is succeeded in the latter position by **Frank J. Berberich.**

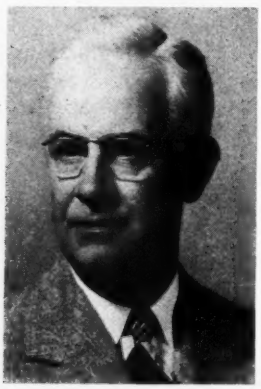
Harold R. McPhail was named works manager in the Utica, N. Y., plant of **Savage Arms Corp.**

Eugene D. Emigh Jr. succeeds **Evan J. Parker,** retired, as purchasing agent, **American Hardware Corp.,** New Britain, Conn.

James K. Lewis, sales engineer, and **Louis F. Johnson,** purchasing agent of Douglas & Lomason Co. have resigned to form their own manufacturers' agency, **James K. Lewis Co.,** located in Birmingham, Mich.

New assistant to the president of **Tempel Mfg. Co.,** Chicago, is **Fred A. Slaughter.**

David Campbell was appointed general manager of the new Chatham, Ont., plant of **Progressive Welder (Canada) Ltd.** He joined the Progressive organization in Detroit in 1940. He has recently been as-

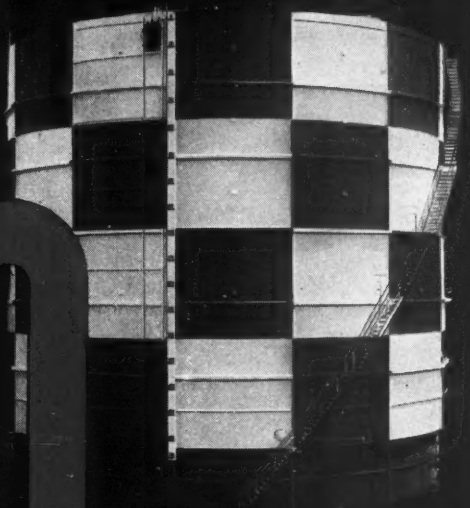


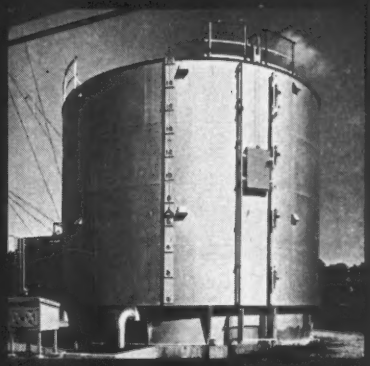
ROBERT M. McCABE
. . . purchasing V. P. at Vickers

JOSEPH A. GRAZIER
. . . American-Standard exec. V. P.

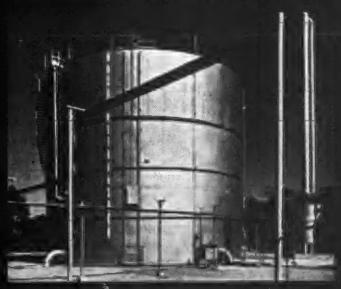
DAVID CAMPBELL
. . . gen. mgr. Progressive Welder Ont. plant

50 Wiggins Gasholder installations in the 3 years since introduction!



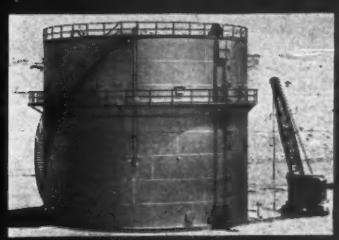


no doubt about it . . . simplified Wiggins design is a better way to store industrial and chemical process gases



it's the **only** gasholder that uses

NO WATER TAR GREASE



it's the **only** gasholder with **AN ABSOLUTELY DRY, FRICTIONLESS SEAL**

Converted from old style!

it's the **only** gasholder that assures

NO WEATHER WORRIES
OPERATING COSTS
MAINTENANCE PROBLEMS

Operates at pressures up to 20" of water. Gas tightness and impermeability of Wiggins dry seal proved in 15 years' service under actual operating conditions. Ask about converting your present gasholders to Wiggins principle.

WRITE FOR NEW BULLETIN WG-22
OR REFER TO BUILDER'S COMMITTEE REPORT (May, 1951), AMERICAN GAS ASSOCIATION

WIGGINS VAPOR SEALS
GENERAL AMERICAN
TRADE MARK

GENERAL AMERICAN Transportation Corporation

General Sales Office: 135 So. La Salle St., Chicago 90, Illinois

Branch Offices: Buffalo • Cleveland • Dallas • Houston • Los Angeles • New Orleans • New York • Pittsburgh • San Francisco • Seattle • St. Louis • Tulsa • Washington • Export Dept., 10 East 49th Street, New York 17, New York • Plants, Birmingham, Ala.—East Chicago, Ind.—Sharon, Pa.

MARVIN L. NELSON
. . . works mgr., Solar Aircraft plant

CLARENCE A. JAROSZ
Bendix-Westinghouse sales

THOMAS SPROULE
. . . mfg. mgr., GE welding dept. at Fitchburg

sistant sales manager at the home office in Chatham.

Marvin L. Nelson was appointed works manager of **Solar Aircraft Co.'s** new Wakonda Works in Des Moines, Iowa. He was chief engineer at the Grand avenue works in Des Moines.

W. C. Birdzell, a purchasing agent at the Peoria, Ill., plant of **Caterpillar Tractor Co.,** will be in charge of purchasing at a new plant to be located near York, Pa. Previously Mr. Birdzell shared responsibilities with **Ridley Orton** at the Peoria purchasing department. Mr. Orton is now purchasing agent for the entire department. **W. G. Schuller** will be assistant general purchasing agent for Caterpillar.

Clarence A. Jarosz was appointed manager, industrial sales, **Bendix-Westinghouse Automotive Air Brake Co.,** Elyria, O. He was assistant sales promotion manager.

A. Gilbert Formel joined **Loewy Construction Co. Inc.,** a subsidiary of Hydropress Inc., New York, as projects manager for heavy hydraulic presses, die forging and extrusion plants.

Steven J. Toth is manager of the newly opened factory branch of **Trailmobile Inc.** in Toledo, O.

Atlas Chain & Mfg. Co. appointed **Frank Ingham** Cleveland manager.

Alfred C. Castle was elected a director, **A. M. Castle & Co.,** Chicago, steel distributor.

Thomas Sproule was named manager of manufacturing, welding department, Fitchburg, Mass., **General Electric Co.** Previously assistant manager-manufacturing of the turbine and welding divisions in Fitchburg, he succeeds **William G. Arnold,** appointed works manager at New Kensington, Pa.

Chris H. Bartlett is manager of **Westinghouse Electric Corp.'s** Sharon, Pa., transformer division. He was sales manager at the Sharon works, and now succeeds **Frank L. Snyder,** recently transferred to the Philadelphia works.

Dan J. Carroll was appointed manager, residential products division, **Detroit Steel Products Co.,** Detroit.

OBITUARIES . . .

F. C. Biggert Jr., 73, chairman of the board of **United Engineering & Foundry Co.,** Pittsburgh, and one of the pioneers in design of continuous strip mills, died Feb. 10. He helped form the company, and from 1919 to 1943 served as president and general manager.

F. J. Neale, 74, former vice president, **Dominion Wheel & Foundries Ltd.,** died Feb. 10 in Toronto.

William C. Moreland, 62, former vice president, **Jones & Laughlin Steel Corp.,** Pittsburgh, died Feb. 16. He retired in 1946.

D. G. Hewitt, 60, circulation representative, STEEL magazine, died Feb. 16.

Joseph C. Snyder, 76, a vice president, **Pullman Standard Car Mfg. Co.,** Pittsburgh, died Feb. 17.

Otis L. Smith, president, **Weldit Inc.,** Detroit, died Jan. 28.

Charles W. Wright, 60, president and chairman, **Badger Meter Mfg. Co.,** Milwaukee, died Feb. 14.

Leo W. Troy, 50, assistant production manager, Rochester, N. Y., Products Division, **General Motors Corp.,** died recently.

G. J. Rathbone, former owner and manager, **Brown Wire Specialty Co.,** Hamilton, Ont., died Feb. 12.

Henry Booth, vice president and director, **Shawinigan Products Co.,** New York, died Feb. 4.

S. W. Campbell, 70, vice president, **Dominion Bridge Co.,** died Feb. 13 in Winnipeg, Man. He also was vice president of Manitoba Bridge & Engineering Works Ltd., Manitoba Rolling Mill Co. Ltd.

John R. Gaut, 57, Chicago district manager-operations, **American Steel & Wire Division,** U. S. Steel, died Feb. 17.

Arlington S. Albright, manager of the Birmingham explosives plant of **E. I. du Pont de Nemours Co. Inc.,** died Feb. 15.

Arthur E. Bendelari, 72, retired president, **Eagle-Picher Co.,** died Feb. 10 in Lexington, Ky.

Carl C. Giles, 75, president, **Phoenix Metal Cap Co.,** Chicago, died Feb. 10 in Florida.

Clarence B. Flint, 72, from 1930 to 1950 vice president and director **National Aluminate Corp.,** Chicago, died Feb. 14.

OSBORN

How to boost foundry production

Consult Osborn Osborn's sales engineers are factory trained to analyze all types of molding and core blowing production requirements. As foundry specialists, they spend all of their time on foundry molding methods and machine applications. From Osborn's complete line of molding machines and core blowers, they can recommend impartially the type of machinery best suited for your needs.

Why not investigate further. Learn what advanced developments are being made to reduce your foundry costs with modern methods and machinery.

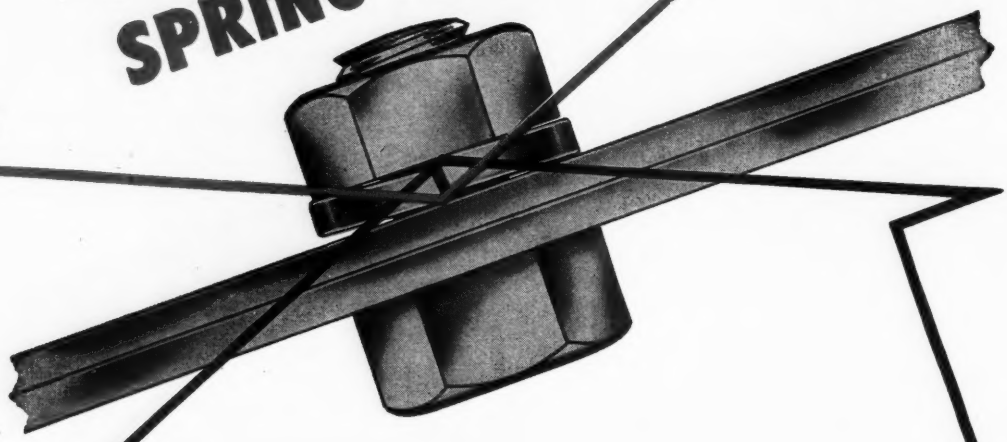
Call or write *The Osborn Manufacturing Company, Dept. 638, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Serving the Foundry Industry for Over 60 Years

Osborn Molding Machines

MOLDING MACHINES . . . CORE BLOWERS . . . INDUSTRIAL BRUSHES

CONCENTRATED SPRING POWER



to keep bolted assemblies under tension – and tighter longer

Reliance Spring Lock Washers offer a dependable method of keeping bolted assemblies tight.

Their helical coil spring design, when compressed, builds up a powerful mechanical reactive pressure between nut or bolt head and the bolted surface. By maintaining bolt tension, this reactive pressure keeps nut or bolt from turning where thread fits are not tight and also automatically compensates for looseness resulting from service wear. Reliance Spring Lock Washers are available with a reactive range adequate to meet every service need.

Reliance Spring Lock Washers also act as hardened thrust bearings, reduce surface resistance and permit greater tightening torque.

Extremely simple, they do not depend upon a design which might fail in service and can be used with any type of nut or under bolt heads — cannot damage bolt threads.

Reliance Spring Lock Washers are available in carbon, alloy or stainless steel, bronze, K-Monel or aluminum.

When product performance and safety depend on bolt tightness, play safe by using Reliance Spring Lock Washers.

EATON SPRINGTITES—Powerful Reliance Spring Lock Washers of proper type and size, permanently pre-assembled on bolts or screws—speed production, cut costs. Write for Eaton Springtite folder.

RELIANCE RINGS—provide strong, heat treated shoulders on shafts or in counter-bores, lock assemblies securely. On in a jiffy, off in a jiffy, they speed production, cut costs. Write for Reliance Ring folder.

RELIANCE *Spring* LOCK WASHERS

EATON

EATON MANUFACTURING COMPANY

EATON RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

Production AND Engineering
NEWS AT A GLANCE

WARM FORGING—Army Ordnance is investigating practical possibilities of forming at "warm" temperatures—700 to 1200° F, as compared with forming at the forging range of 1800 to 2000° F. Advantages sought: Prevention of scale formation, shorter heating time, less fuel consumption, longer die life and longer life of refractory furnace linings. Warm forming at 1200° F is promising. Researchers say less pressure is needed to work metal through the dies at the lower temperatures than is currently required.

EXTRUSIONS BY THE TON—New extrusion press being installed at Alcoa's Lafayette, Ind., plant exerts a force equal to the weight of a mile-long string of loaded cars—13,200 tons. Weight of extrusions that can be produced will be quadrupled from 600 pounds per piece to 2300 pounds. While maximum length of extrusions remains at 90 feet, size which can be produced in that length increases from 6.7 pounds per foot of length to 25.5 pounds, or from 5.6 square inches in cross-sectional area to 21.3 square inches. Maximum circumscribing circle diameter for shapes may increase from the present 14 inches to 23 inches.

SOUND ON A STRIPE—A new Bell & Howell 16 mm motion picture projector records and plays back sound by a stripe of magnetic material on the edge of the film. The company also has a process for permanently coating film for magnetic sound. When the film is projected, sound can be recorded and "stored" on the magnetic stripe, ready for playback. Commentary can be erased and re-recorded an unlimited number of times.

TV IN THE SIXTIES—Television sets 15 years from now won't resemble present gadgets either in design or in price if Robert W. Galvin's predictions come true. Here are some of the improvements the Motorola vice president foresees: Compact sets powered with their own source of atomic energy; three-dimensional television pictures; radically lowered prices resulting from developments like the germanium transistor and printed circuits.

BEEFED-UP JEEP—Scheduled for production this spring is an improved and more powerful jeep. A big change is in the engine where a 72-hp F-head engine will replace the 60-hp L-head used on the current models. Improved fuel economy plus a larger gas tank, will increase cruising range from 180 to 300 miles. Kits supplied with each jeep will make it adaptable to arctic, desert or water use. Conversion to underwater operation will take less than 15 minutes. No mention is made of improvements that will eliminate the disease that afflicted countless World War II servicemen—Jeep Rider's Seat.

MORE JET BLADES—Bottleneck in the turbojet engine production program may be cracked by G-E's new process for fabricating stator blades of compressors. Designed to replace forging, the new method promises savings in critical materials and millions of dollars annually in jet engine costs. Blade fabrication will relieve pressure on the nation's overtaxed forging facilities. Current J-47 production models have about 2000 compressor blades; more than half of these are on the stator. Rotary blades will continue to be forged because of high centrifugal stresses involved.

MANGANIFEROUS CHEDDAR—Aging time of cheese may be speeded up with a trace of manganese, if research at Washington State Tech is successful. Reduction of aging time from months to days would save considerable inventory cost.

NOISE AND INEFFICIENCY—They're still arguing about the effects of noise in industrial plants. Nobody has come up with an accurate measurement of the actual damage excess sound causes, but the experts generally agree that too much noise is annoying. Most useful purpose a noise survey can fill is to indicate inefficiency in machines and equipment. Do something about the causes of noise and you'll be saving wear and tear on equipment and personnel. p. 76

GASOLINE FROM COAL—Koppers Co. is building a pilot plant to make gasoline from coal by hydrogenation. The process uses powdered coal in a slurry, the reactions taking place under high pressure. Program puts special emphasis on chemicals which may be produced.

BILLIONS FOR RESEARCH—Research and development expenditures during 1952 will total $2.93 billion, predicts the Defense Department's Research & Development Board. Of these funds, $1.64 billion will come from government. The money will be used about this way: $1.82 billion by industry, $280 million by universities and $830 million by government. Increase over 1951 is about 13 per cent.

SHEET METAL PICKUP—Buick's sheet metal plant at Flint, Mich., is feeling the favorable effects of new materials handling equipment and additional manufacturing machinery. Production is up, scrap losses down and the stampings are better. A 150-kv resistance mash welding machine forms and welds fenders in one operation. p. 78

Metalworking Outlook—p. 39 *Market Outlook—p. 133*

TONED-DOWN NOISE . . . *Tunes Up Operations*

Noise level indicates how much energy is being expended for other than useful purposes. Tracking down noise reveals many avenues for improvement in plant efficiency

By CHARLES E. CREDE
Chief Engineer
The Barry Corp.
Watertown, Mass.

WHEN steel meets steel, there is bound to be noise. Big question is how much noise. When does the hum of productivity begin to carry overtones of inefficiency? It takes energy to produce noise, and unusually high noise level means energy being expended for other than a useful purpose. Excessive noise from a machine indicates it is working too hard, or needs maintenance.

While few companies face a noise problem like that of a freight-car-producing subsidiary of New York Central confronted with claims for deafness totaling over a million dollars, excess noise is generally acknowledged to have an effect on personnel.

Earmark of Inefficiency — To what extent noise abatement improves performance of personnel cannot be concretely stated. Few studies have been made that measure effect of noise on either personnel or production. Benefits of noise control, therefore, cannot be expressed in dollars and cents. Noise, at best, is an indicator of how well your plant operates. Investigation and control of noise can open many avenues of improvement in plant operation because so many factors contribute to noise level.

Biggest noise producer in metalworking is impact force. Extraordinary force required for press operations produces excessive noise, and causes rapid deterioration of dies.

Noise and die wear on punch presses can be reduced by varying angle of the punch. Fig. 3 shows a punch press in which all shearing action occurs simultaneously. Large force involved is indicated by height of the shaded area at right of the figure. In Figs. 1 and 2, lower face of the punch is slightly inclined and plate is sheared gradually. Reduction in impact force required corresponds to angle on the punch. Duration of the force is increased proportionately.

In an operation where several holes are punched at one stroke of the press, a reduction of noise will result if speed punches are used that punch holes progressively. Noise from punching and blanking operations performed on multi-stage dies, can be minimized by equalizing work between stages and having one stage precede the other.

In a metalworking operation, hardness or yield strength of material is a primary factor in the noise generated. Harder material requires greater force, causes higher noise levels. Operations on mild steel are quieter than on stainless steel. Brass and aluminum are least noisy. Thin material working is more annoying to personnel than similar operations on thick material because natural frequencies of the former are higher. High frequency noise may be more annoying than noise of a greater intensity but lower frequency.

Maintenance Cuts Noise — Not all noise is caused by the actual metalworking operation. An appreciable part of it results from improperly adjusted machines. Gears, clutches, bearings, automatic feeds are noisy if clearances become excessive.

Double impact makes many presses noisy. One impact results when the punch hits the work, the second occurs in the clutch mechanism an instant later as flywheel catches up with crank.

Noise often results from material handling. In certain types of shearing operation, material falls several feet to a concrete floor, or accumulation of material. Air ejection nozzles cause a steady noise of considerable intensity. Proper selection of machinery can result in noise reduction. Overloaded machinery is excessively noisy because machine structures are easily excited to vibration by the metalworking forces. An operation takes the same force on any machine, but vibration is less and noise intensity lower when the job is done on a larger machine.

Acoustical Shields — A shield around a machine prevents direct radiation of noise. To be worth while, noise shields should be heavy. A shield of slight mass may vibrate in response to the noise it is shielding and radiate the noise throughout the room. Shield should be lined with light, porous-textured acoustical material. Gears, clutches and other mechanisms which do not have to be observed or manipulated may be shielded.

Acoustical treatment of ceiling and/or walls or the room in vicinity of a machine curbs noise reverberation. In a low-ceilinged room, it is necessary to treat only the ceiling in immediate vicinity of the machine. If ceiling is high, 50 per cent of wall area should be treated, preferably in patches alternated on opposing walls.

Acoustically treated baffles suspended in the path of severe sound radiation are helpful. A jewelry concern installed such baffles over a battery of drop hammers. Noise level fell even in the immediate vicinity of the machines and a greater reduction was apparent in remote areas of the room.

Abstract of paper delivered Feb. 7, 1952 before Service Training Course, School of Public Health, University of Michigan.

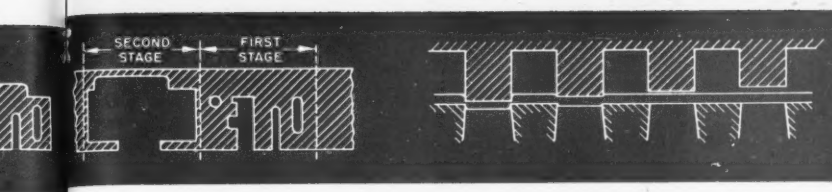


Fig. 1—Improvement in noise volume results if work on multi-stage dies is equalized, and one stage precedes the other as shown schematically

Fig. 2—Several holes may be punched at one stroke of the press with less impact force if punches are stepped. Holes are punched progressively

Of two plants with equal facilities, the quieter one has happier personnel, better operating machines and produces more.

Isolators under machines are effective in decreasing transmission of noise to a room below. But floor construction often limits effectiveness of noise isolators. Machinery mounted on concrete floors is well-adapted to noise isolators. Isolation is difficult if offending machinery rests on a wooden floor. Securing machine to a massive concrete block mounted on isolators is most effective method. Installation adds stability because inertia of the block reduces motion of the machine.

Conduits Transmit Noise — For another source of noise, look to rigid pipes, conduits, ducts. A short length of rubber or flexible metallic hose in a pipe or conduit tends to reduce the transmission of noise. A canvas joint in a ventilation duct serves the same purpose.

For certain types of machinery normally installed at ground level, it is difficult to predict extent of noise transmission or introduce means to control it unless transmission of noise to remote areas has been considered, in the original design of the building. Forces frequently are transmitted through the soil in an unpredictable manner and impact noise can frequently appear at remote and unexpected locations.

To combat these conditions is usually difficult and involves a large and expensive installation. Mounting heavy machinery in a manner that will insure effective control of impact noise is more costly than the conventional installation. It is usually justifiable therefore to employ the conventional installation for heavy machinery consisting of a large concrete block supported on the soil or on piles.

Noisy Below—Lower spaces in a multi-story building are subjected to objectionable noise from impacts on the floor or floors above, walking, trucking, dragging objects over the floor as well as machinery sounds. This noise may be eliminated or reduced by treatment of floors and ceilings. Use of double floor construction or a cushioned upper surface on the floor reduces noise radiated to spaces below the floor.

In a building in which impact noises will occur, ceiling should not be rigidly connected to the floor joists. Use of a sub floor, a false ceiling, and absorptive blanket between will combat noise. Any means of introducing resilience between floor and source of impacts is useful in reducing noise.

Management's Views—Reaction of management to a noisy plant has been investigated. It seems to be the general philosophy of management that a metalworking plant is expected to be noisy, and that workers in this industry expect to work in a noisy plant. From a psychological viewpoint, noise creates a feeling that the plant is busy and the worker's job is secure.

It has been demonstrated, however, that a progressive engineering approach to the problem of noise reduction can cause a substantial decrease in overall noise level. After they become used to this change, workers are pleased with their new working conditions and management is pleased with the savings that accompany reduced noise.

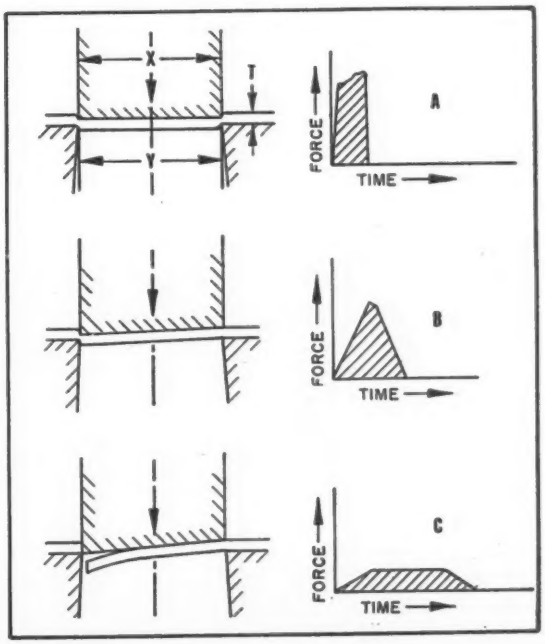
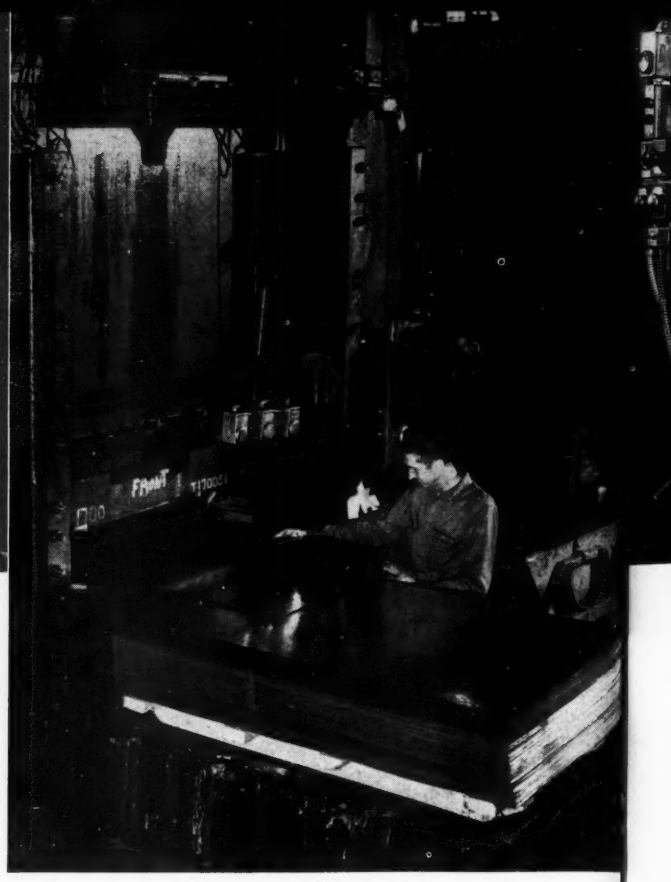


Fig. 3 — Schematic drawing showing effect of shear angle on a punch. Diagrams to right show progressive decrease in force and increase in duration of impact as angle is increased

Machinery Changes *Revitalize* Sheet Metal Plant



Buick finds investment in new machinery and equipment nets production gains in its sheet metal plant

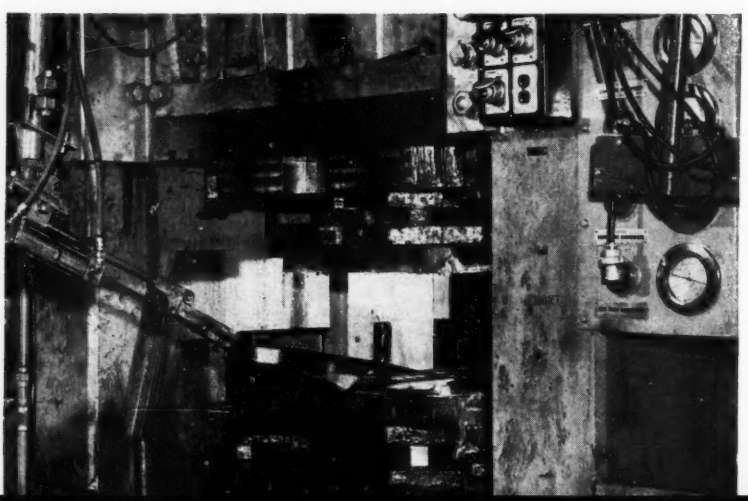
By A. B. MOOERS
Manufacturing Engineer
Buick Motors Division
General Motors Corp.
Flint, Mich.

ECONOMIES in production, better stampings, reduced scrap losses are among advantages accruing from recent changes made in the sheet metal plant of Buick Motor Division, General Motors Corp., Flint, Mich. Additions are new equipment, welding, mechanical handling devices and an 850-ton double acting Verson press.

Feature of the press is a hydraulically-operated outer blank holder slide of 350-ton capacity. It is currently set to apply 40 tons at front corners and 20 tons at rear corners for the 4½-inch draw on a lower crankcase pan. Setup time is saved because controls can be reset as a die is changed and then later put back on. Press makes seven working strokes a minute, is equipped with an Iron Hand to unload the drawn part. Scrap losses are 75 per cent less.

Machine Folds, Welds—Replacing fixture that folded fenders and an automatic gas shielded arc seam welder is a 150 kv resistance mash welding machine that does both jobs. When a flat blank is located on bed of the new machine, gates swing up to shape blank around central form. Overlapped edges of blank are pressed together by a copper-alloy backing strip. Welding wheel is fed forward to press against underside of overlap as the weld is made.

Loading press for drawing one half of a gasoline tank. At rear of press, Iron Hand unloads the stamping and drops the part on a conveyor belt

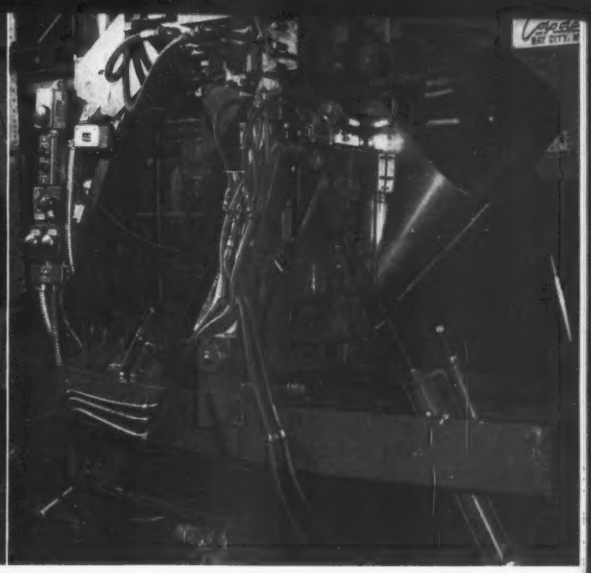


Oil pan drawn in double-acting Verson press is removed by Iron Hand. Gages to right on press show pressures applied at four corners of blank holder

Weld differs from a seam weld in that the pressure applied flows the metal between the wheel rim and the backing, mashing it out. Joint is thinner than double metal thickness. When outer step is dressed off, a practically flat joint results. Upon final finishing, joint is nearly invisible. About 179 fenders an hour are folded and welded by the machine.

Mechanical Handling — Several

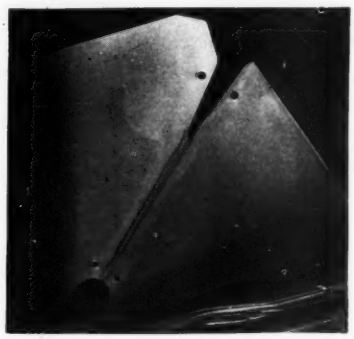
Front fender blank is shown at left in machine before forming and mash welding begins. Hinged components form blank and elevate rocker strip to vertical position.



Wheel traverses seam to produce mash weld. Position of machine as weld is made is shown at right. When it is completed, current goes off, machine opens automatically

mechanical handling devices are used to speed movement of stampings for gasoline tank upper and lower halves. Blanks are fed to the die by an operator, but are removed by an Iron Hand which drops the stamping onto a belt conveyor. Stamping advances to a stop and is picked up by an air-operated transfer device. It is swung horizontally to a point above a second die and dropped on the male half on the bed of the press. Operator of the second press unloads the press. Manpower requirements for the two presses are halved. Formerly two more operators were needed.

With this setup, over two men turn 313 stampings per hour.



Front fender blank after forming and mash welding in dual purpose machine. Small holes locate blank, are trimmed out after subsequent drawing

Combined Arc-Air Jet Process Cuts Tough Metals

HARD-TO-MELT metals pose less of a problem when welds or cracks are removed by a process tested extensively at National Supply Co., Torrance, Calif. Process utilizes an Arcair torch, which combines the usual arc of a cutting and gouging torch with a stream of compressed air.

Torch is effective on naval armor, welded with austenitic chrome-nickel, which does not readily oxidize. Ordinary oxygen and acetylene methods can not be used and chipping is difficult because of work-hardening properties of the metal. Welds were first successfully removed from this material in 1941 by a combination of an arc and air jet to blow out the molten metal. But job required two men, one to hold the arc, the other to hold the air jet.

Man-Days Saved—First torch integrating arc and air jet was completed in 1948. With this torch, 2400 feet of ⅜-inch austenitic fillet weld was removed in 20 man-days. Removal by chipping would have taken 120 days and required redressing of chisels 12,000 times, the company states.

Tests comparing Arcair torch and a gouging oxygen torch indicate there is no difference in speed between the two processes. Big advantage of Arcair torch is the continuous flow of air during the cutting operation. This tends to reduce the temperature of the metal. In tests, a 6-inch steel plate was cut with an Arcair torch for one minute. A pyrometer recorded a temperature of 250°F. Same test with oxygen gouging torch produced a temperature of 600 degrees. For a two-minute cutting interval, temperature rose to 450° F with an Arcair torch, 850 to 1000°F with oxygen torch.

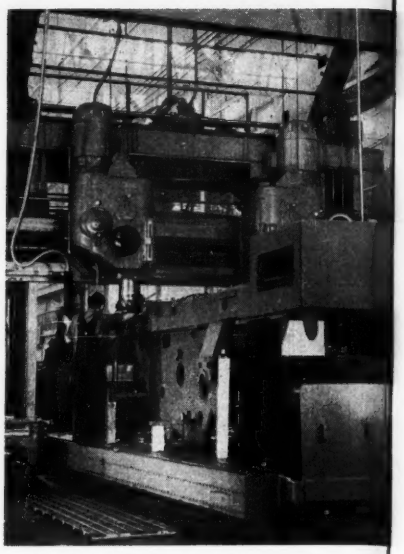
Metal, Too—Other advantage of Arcair process is the saving in metal over the chipping method. A wider groove must be cut to chip to the same depth as the torch cuts. Larger groove takes more weld metal. In a test, it took 70 minutes, 6¼ pounds of weld metal for an Arcair groove. Chipped groove took 112 minutes and required 8 pounds of weld metal. While a chipper can remove six to eight pounds of metal from 0.25 per cent carbon steel castings in one hour, the torch removes as much as 28 pounds of metal in the same time. After reviewing tests, National Supply states the process removes 200 per cent more metal in a given time.

Equipment for the process is ⅜ by 12-inch carbon electrode, 300 to 400-amp dc conventional welder, compressed air and the torch.

ONE SETUP MILLING . . .

Slices Machining Time on Complex Weldments

Reduced unit cost, machining accuracy and production line advantages are provided by Hypro planer type miller working on excavator revolving frames and industrial cranes



Saddle feeds from ½ to 40 inches per minute can be engaged by the operator from either of the two pendant or pedestal control stations

HUGE fabricated weldments regularly are machined to dimensions as close as 0.002-inch at Harnischfeger Corp., Milwaukee. In this plant, large excavator revolving frames, as well as heavy industrial crane units are produced to standards normally associated with machine tool building.

Successful use of antifriction bearings, complicated gear trains, high speed electric motor and precision gas engine drives anticipates high over-all accuracy of frame and supporting assemblies. Consequently it is important that these fabricated and machined parts be produced with minimum cumulative error to avoid unusual field trouble.

Same general type of machining was performed previously on the excavator revolving frame with other machines. In such instances the workpiece had to be set up several times to perform the required operations. Because of this and similar factors, sacrifices had to be made in the over-all time required to produce the frames.

Factors in Selection — Exploration of new methods and means to produce finished weldments naturally led to a machine tool which would provide production line advantages, reduced unit cost and machining accuracy. In addition, the machine had to be flexible enough to handle different types of work in order to take care of advances in excavator or overhead crane design.

Prior to installation of the Giddings & Lewis Hypro planer type milling machine, there was no single metalworking tool available that would meet Harnischfeger's specific requirements. Workpieces 12 feet wide, 9 feet high and 26 feet long may be placed on the machine table and efficiently milled on three sides. Or it is possible to place a number of large parts on the table and perform in-line milling operations.

Size of the revolving top frame determined in part the size of the new Hypro machine. When the complete excavator is assembled it is shipped on a standard freight car. Consequently, its over-all width can not exceed 11 feet 6 inches. Table width of the planer miller is 12 feet, which is sufficient to take care of the largest excavator unit now built by the company. Another important factor in milling the weldment—it is only set up once to perform a wide range of operations. These include milling 12 pads and roller path, milling four pads for the motor base and face milling six bearing holes and the pedestal stand hole.

Smart Scheduling—Boring operations are not performed with the milling heads, even though it is possible to use the heads for occasional pickup operations. The weldment is sent to other machines for boring, drilling, tapping and reaming operations. Shop practice emphasizes the importance of using a single machine to do one type of work and following production line methods principally to increase work output. Performing these operations on the new Hypro planer miller reduces overall machining for the frame as much as 25 per cent.

Both rail heads are used simultaneously to mill the circular roller bearing path. Milling head feeds can be engaged in conjunction with table feed to profile mill this important surface. Twelve-inch cutters are mounted on the 10-inch spindles of the milling heads. These independent units are equipped with 50 hp motors providing ample power for a broad range of heavy duty milling operations. Individual pushbutton controls engage each rail head. Either head, as well as machine function, responds to these controls. This arrangement makes it possible for one operator to engage the milling heads without leaving his work station.

Machine scales and verniers obtain the close tolerances required. No work layout is required prior to milling. Machine units maintain accurate dimensions and finish surface relationships. In addition to scales and verniers, each head is equipped with a dial indicator and is arranged to receive precision job rods or measuring blocks.

Versatile Too — Work handling capacity is not limited to a single type of work. Numerous weldments are efficiently machined in addition to excavator revolving frames. Another typical job is the milling of large overhead crane trolley frames. Two of these units are placed on the machine table

for milling four corner bearing surfaces. When the trolley frames are properly mounted on the machine table it is a simple matter to mill each of the four corners without fear of one surface being higher or lower than the other three. They are milled true within a few thousandths laterally, diagonally and longitudinally. This method of machining eliminates later assembly and fitting problems.

Working area of the machine table makes it possible to place complete weldments in position for milling. Formerly, it was necessary to handle these particular parts in two sections, requiring work holding and assembly fixtures before it was possible to obtain the final accuracy now obtained. In addition to this feature, in-line mounting of the weldments reduces floor-to-floor time on the parts. Machine settings to mill bearing surfaces do not have to be repeated for the individual units which reflects in considerable time saved.

No Beef Needed — Thymatrol-electronic control over machine functions marks an advance in planer type milling machine design. Conveniently located push-button controls convey the operator's signals to the electrical panels. The machine functions respond instantaneously to the impulses. The use of electronic controls provides feed and traverse movements in increments practically impossible to obtain in machines equipped with conventional gear boxes and their ratios for speed and feed changes.

Another important feature of electronic controls rests in the elimination of physical effort on the part of the machine operator. Fatigue is reduced to a minimum. The operator selects the best position to observe the milling operations and has complete control of the machine through the pendant station. It is unnecessary for the operator to move around the work and the machine to reach mechanical controls.

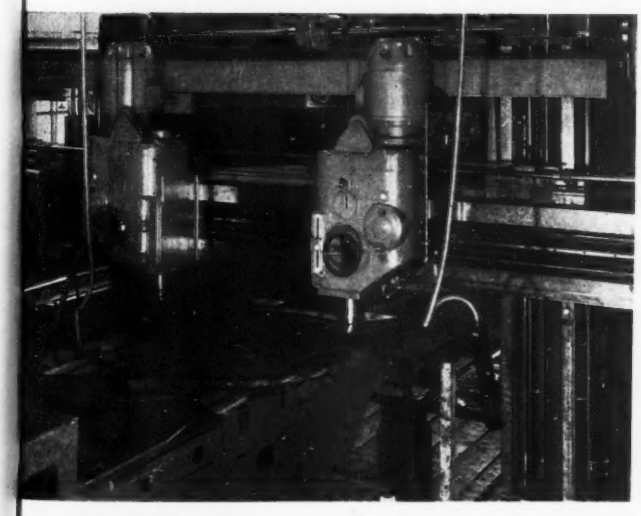
Structural Features—Other features not only add to the machine's flexibility but also to its overall productive capacity. Individual milling head units having separate drive motors are an important feature of the machine. With independent head arrangement, it is unnecessary to have a complicated drive mechanism from a single, centrally located motor. As a result, drive shafts to the various heads are eliminated reducing maintenance and precluding the possibility of power lags and wind-up ordinarily found in single motor drives.

In addition to this mechanical design simplification through individual motor drive to each head, actual power consumption is reduced. This is especially true in those instances when only a single head is operated. Were the machine powered by a single motor instead of separate motors, the power load would be considerably more, even though the operation might be simple and full power not required. Then too, individual unit construction provides the operator with more latitude in presenting the cutting tool to the surface to be machined.

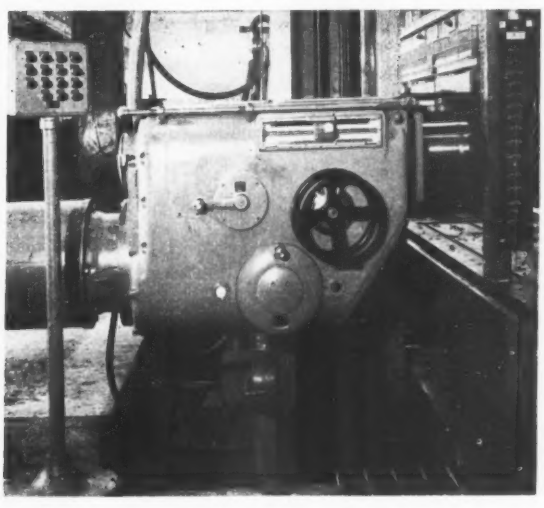
Question of weight factor may be raised regarding the mounting of milling heads and 50 horsepower motors on the rail. To overcome this particular problem, an entirely new traveling counterbalance is provided to prevent rail deflection caused by milling head weight. The complete rail assembly is raised and lowered through a 15 horsepower elevating motor and reduction gear. This same unit rapidly traverses the heads on the rail through a cable-pulley arrangement.

Face of the housing across the bearing surfaces is 26 inches, depth of housings is about 10 feet and their height is close to 20 feet. In addition to supporting the machine cross tail and side milling heads, the housings also support the cross structure on which the rail elevating motor is mounted as well as the traveling counterbalance system. Counterbalance weights are placed on the inside of the housings.

Two rail heads can be operated simultaneously from control stations. Unusual cutter range and manipulation is possible by electronic activation of rail head plus table feed



Side milling heads eliminate the need for resetting awkward workpieces. Above hand wheel is dial indicator with slot to receive job rods or blocks for precision operations



Firing Temperatures Controlled

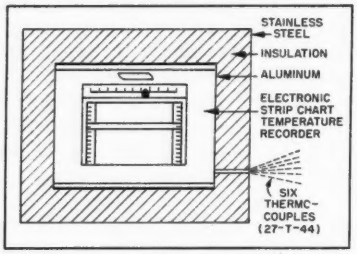
Electronic type recording instruments riding through furnaces in a specially designed box, give porcelain enamelers closer control of furnace temperatures during production

By MICHAEL BOZSIN
Research Engineer
Ferro Corp., Cleveland

DETERMINATION of firing temperatures in the production of porcelain enamel causes much concern to the ceramist because many of the physical properties of the finished ware depend upon this factor. Development of porcelain enamels in the laboratory results in a specific firing range at which best results are obtained.

Troubles Aplenty — Usually, enamels have a broad firing range, but if this exact temperature range cannot be controlled accurately and is only approximated in production, it is possible to run into serious trouble in firing the ware. So it is imperative to have a method of ascertaining actual firing temperatures in a continuous production furnace, and also to enable the porcelain enameler to determine accurately the firing cycle.

In the past, results were obtained by hanging thermocouples on the furnace chain, and taking readings at regular intervals of time, or distance of chain travel through the furnace. These intervals were then plotted on a graph, resulting in a temperature gradient chart, time and temperature being plotted against length of furnace from preheat zone through the firing and the cooling zones.



Cross-section of 400-pound Bozsin box

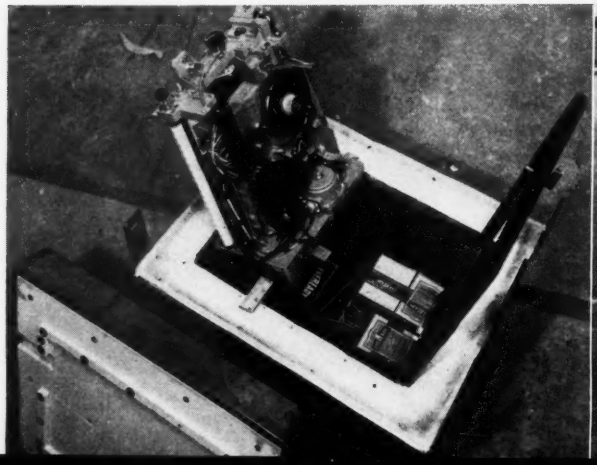
This method gave information concerning temperature conditions in the furnace, but had its drawbacks. Thermocouples were relatively expensive as 200-foot lengths were employed; often as many as three were used simultaneously. These couples would not last long, due to the twists and turns which had to be taken in the furnace going around bends, plus handling. In addition, accidents would happen due to couples knocking ware from the conveyor, sometimes causing wrecks which would shut down the production line. Also a substantial amount of manpower was required to run tests of this nature. The human element entered the reading of instruments accurately at high speeds.

New Method — After several years of this type of temperature gradient study in various plants throughout the country, it was concluded that a better method of taking temperature was possible. The idea was that use of an electronic-type recording device, which would plot curves as it passed through the furnace would be of value, if a box could be built which would insulate the instrument from the furnace. As an instrument of this type cannot operate above a maximum temperature of 130°F, it was necessary to have a box which could stand the heating cycle of a porcelain enameling furnace and at the same time protect the instrument.

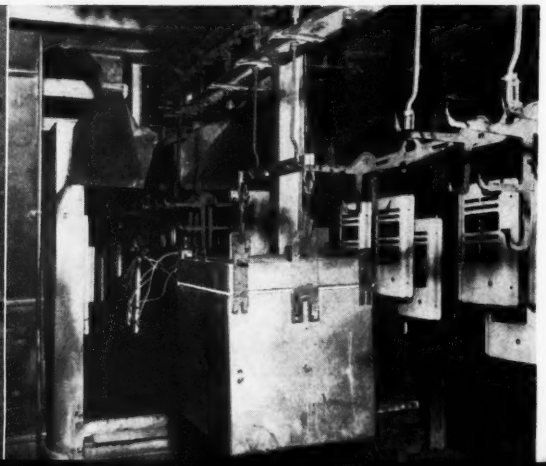
First box, known as the Bozsin box weighed approximately 800 pounds. Outside shell was welded stainless steel; the inside box, containing the instrument, was aluminum. Space between was packed with insulation. In addition to a Brown ElectroniK recorder, an inverter and dry cells for power supply to the recorder were included.

This new box weighing less than 400 pounds, makes use of every inch of available space to decrease weight and size. The instrument gives more information in that the recording instrument is a six-point

Internal view of recorder contained in insulating box



Bozsin box leaving furnace after 17-minute test at 1560°



multiple recorder, in contrast with a three-point recorder previously used. One run of the instrument through a continuous furnace checks six points simultaneously, after which furnace adjustments can be made if required.

Zones Identified—During the run through the furnace, the recorder automatically switches in sequence to each of the six measuring points by means of a selector switch incorporated in the instrument. Measured temperature at each of these points is recorded on the chart by a characteristic symbol which readily identifies each record with an associated measuring point.

Many cases of temperature difficulty have been corrected. There are numerous specific examples of problems encountered, but most of the difficulties were attributable to one or a combination of the following causes: 1) Improper burner adjustment; 2) improper draft; 3) improper zone control; 4) overloading of furnace; 5) improper chain speed; 6) improper thermocouple location and maintenance; 7) ware temperature variations due to design; 8) time of soaking period; 9) peak of soaking temperature, and 10) temperature relation between ware and control temperatures.

This new box was designed and constructed with Ferro specifications by Gilmore Technical Associates of Cleveland; metal was fabricated by Klaas Machine & Mfg. Co. also of Cleveland.

On the test runs of the box with a furnace setting of 1560°F and 17 minutes furnace travel, a maximum temperature of 86°F was reached inside the Brown recorder.

Corrosion-Resistant Mist Prevents Rust

Volatile corrosion inhibitor can be powdered on, or dissolved in alcohol and sprayed on. Put into solution, it will serve as wrapping paper coating or as a dip

ANSWER to the rust problem on steel drums for Wheeling Steel Corp. is VPI, a volatile corrosion inhibitor marketed by the Shell Oil Co. Customer saves expense of removing the rust preventive material.

Active substance in VPI is a volatile nitrite salt, dicyclohexylammonium nitrite. Vapor from VPI crystals condenses on metal surfaces or dissolves in condensing moisture. Some type of barrier must be provided to prevent escape of protective vapors. No hermetic sealing is necessary. Chemical can be applied as a crystalline powder, dissolved in alcohol and sprayed, put into solution for metal dips or used as a coating on wrapping paper. It makes possible the protection of steel products between operations, in shipping and in storage.

Wheeling Steel uses a 5 per cent solution of VPI in S. D. alcohol (special denatured, formula 23-A). Conventional paint spray guns are used to fog the solution into interior of steel containers. Amount of solution varies in this manner:

5 gallons	2 to 3 grams VPI
30 gallons	6 to 8 grams VPI
55 gallons	12 to 15 grams VPI

Solution Tested — Tests were made by spraying the solution into the containers under good atomization conditions. Then containers with and without VPI were capped and set out in the open. An appreciable amount of water from the atmosphere was sucked into the containers. After three months examination revealed rust in the non-VPI drums and a negligible amount in those containing VPI. Duration of protection depends on maintaining a suitable barrier over the protection period.

Two types of VPI are currently being used at Wheeling Steel, VPI 220, and VPI 260, the former having greater volatility but less stability at higher temperatures than the latter.

VPI 220 (5 per cent) in S. D. alcohol is used for tight-headed steel drums, VPI 260 for open-head drums. VPI is suggested where plain steel (inside) has been used by the customer. Drums are treated with VPI only on approval of the customer. Before VPI, oil films were used on many containers and had to be removed by the customer at his own expense.

Preventive action in sodium nitrite is due to nitrite ions. Any salt giving off these ions in a basic solution gives similar protection. Solid nitrite differs from the alkali metal nitrites in being slightly volatile at atmospheric temperature, which makes it possible to inhibit corrosion in packaged steel parts without application of a direct coating.

VPI 220 is a white crystalline solid that melts at 310°F without decomposing. Specific gravity of its water solution is 7. Both are moderately soluble in water, more soluble in methyl alcohol, slightly soluble in low molecular weight polar solvents and practically insolvent in hydrocarbons. They are relatively odorless. VPI 260 melts at 390°F and specific gravity of its water solution is 7.2.

Steel containers that are used for packaging fire brick cement are shown getting a rust-preventive fog of VPI at Wheeling Steel Corp. before they are shipped

Substitutes for Critical Metals, Alloys

Results of Navy's research program to find substitutes and reduce use of scarce metals are encouraging. By-products are lower costs and improved performance

NAVY bureaus are eliminating, reducing or substituting for critical metals in everything from window screens to jet engines. Critical metals include copper, lead, nickel, tin, zinc, various rare metals used in comparatively small quantities to produce alloy steels, and, to a lesser extent, structural steel.

Here is a metal-by-metal summary of the program:

Copper — Bureau of Ships is adopting glued scarf joints to increase length of planking for wooden minesweepers and estimates ½ ton of critical silicon bronze fasteners will be saved on each small minesweeper. The program will eliminate 2000 fasteners with a money savings of over $3000.

This bureau also is investigating possible use of clad steel on Navy ships. A typical saving for each hundred pounds of 10 per cent Inconel clad steel would be 66.10 pounds of nickel and 12.58 pounds of copper. Program is still in the research stage.

Bureau of Yards and Docks uses zinc-coated steel or wrought iron pipe—the latter whenever possible. This bureau also is using asbestos-protected or zinc-coated metal. Plastic screen cloth is being recommended. Where metal is necessary, aluminum is specified. The bureau also is specifying plated or painted hardware and accessories.

Bureau of Ordnance substitutes steel piping for copper in certain gun mounts, and is using steel instead of copper and zinc for cartridge cases. Plastic and steel tubing is being used instead of copper and aluminum tubing in certain rockets.

Lead — Bureau of Yards and Docks specifies mixed-pigment type finish paint instead of all-lead pigment.

Nickel — Every activity of the Navy is seeking substitutes to reduce use of this metal. Since much of the nickel production goes to stainless steel, research centers on this metal.

A five-month experiment using plastic pipes on a Navy DE has been successful. Plastic 2-inch fire main with 3/16-inch wall thickness was placed in representative places to test resistance to heat, shock and average salt water service conditions. Sections under 90 psi pressure located near 5-inch gun mounts were unaffected by gun fire.

The plastic pipes did not sweat, so savings probably will be effected because lagging will not be necessary. Pieces placed just above boiler drums, where the air reaches 180° F, were unaffected after five months. There was no corrosion and no pitting when velocities up to 12 feet per second were used.

Chrome Stainless — Straight chromium stainless is specified by this bureau in a number of parts formerly made of 18-8 Cr-Ni.

Porcelain-enameled steel parts are being used to save corrosion-resisting metals, lengthen life of equipment and reduce maintenance costs.

By using high strength alloy steels for propellor shafts, weight savings up to 10,000 tons of steel in one building program at a net alloy cost no greater and possibly less than required for lower strength alloy shafts have been made.

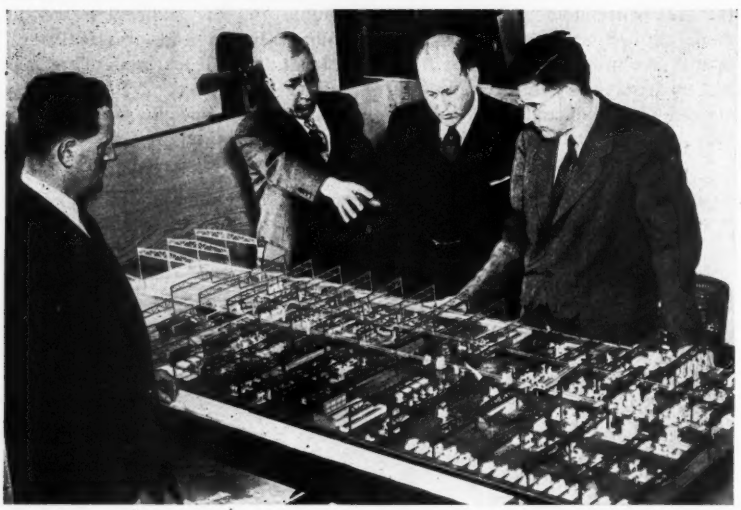
The bureau also sponsors development of low alloy ferritic tubing for high temperature steam service to replace high alloy austenitic tubing.

Bureau of Yards and Docks specifies chromium steel for corrosion resistance instead of nickel-copper alloy or chromium-nickel steel. Cadmium or chromium plating also is being used.

The Bureau of Ships currently is experimenting to see if high chrome-nickel welding electrodes may be replaced in part by ferritic core, low hydrogen covered electrodes to conserve nickel and chrome.

Since 1938 an austenitic type—25 per cent chromium and 20 per cent nickel—electrode has been used for welding armor plate and other high tensile steels to assure welds relatively free from underbead cracking, with an equivalent in yield strength and an ultimate tensile strength of the special treatment steel. The new rod carries only 2 per cent nickel and no chrome, but insures a more crack-free weld.

Tin—All Naval activities are us-



INDUSTRIAL DOLL HOUSE: Officials of Knight Models Inc., builders of three-dimensional scale models, and Fairbanks, Morse & Co. study a model of the new Fairbanks, Morse pump manufacturing plant being built at Kansas City, Kans. The model is used to increase efficiency and to improve plant methods

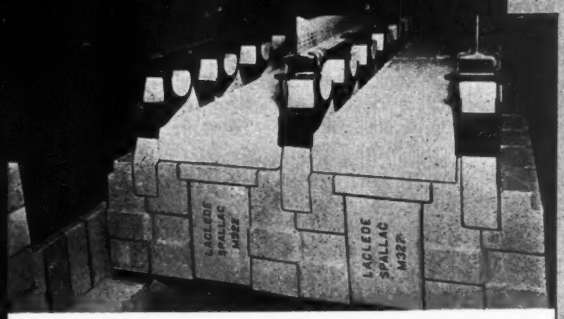
Laclede Arches

for the steel industry help meet production trends

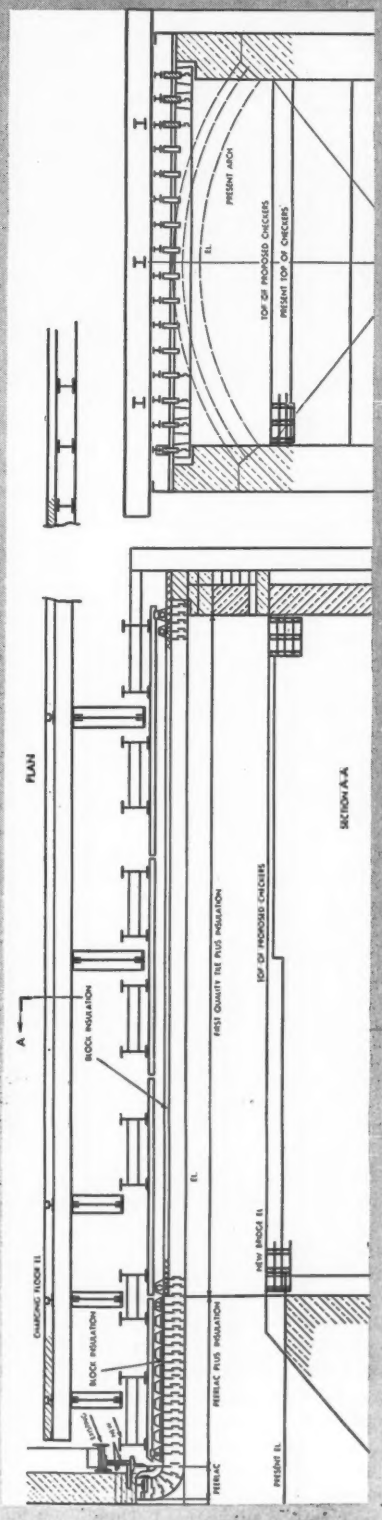
The preliminary drawing, shown in part here, is symbolic of a general trend away from the old sprung arch construction to a more efficient suspended arch construction on Regenerator Roof, Fan Tail, and Nose construction. This trend has affected not only new furnaces being built, but on old furnaces many operators are changing over in order to get the advantages suspended arch construction offers:

1) Increases checker capacity.
2) Higher temperature of air leaving checkers results in lowering fuel rate.
3) Simple, sturdy construction.
4) Simplifies inventory.

We welcome the opportunity of talking with furnace designers, builders, and users of refractory enclosures in order to analyze with them the problems of increased furnace production, efficiency, and economy that must be solved when so many units must operate at or over rated capacity.



ASSEMBLY, LACLEDE TILE SUSPENDED ARCH



TYPICAL REGENERATOR, FAN TAIL, AND NOSE

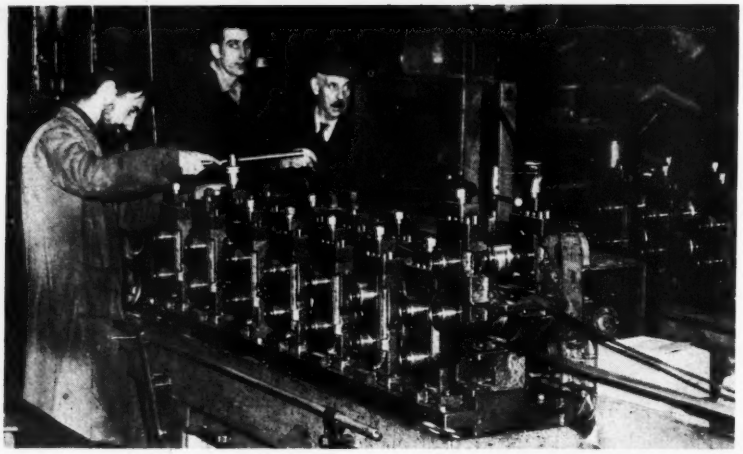
Laclede Arch Company

Division of Laclede Christy Company

1705 Mallers Bldg. 5 S. Wabash Ave. Chicago 3, Ill.

Telephone: Andover 3-6255

Branch Offices: Pittsburgh • New York • St. Louis • Los Angeles
Seattle • San Francisco



ARMCO OPERATION: Bundy tubing is processed from copper-plated and steel strip at Letchworth, England plant of Armco International Corp. Mill forms, braises and tins at a continuous rate of more than 100 fpm. Recent expansion ups yearly capacity of the three-shift operation to about 100 million feet

ing solder with the lowest practicable tin content.

Zinc—This metal, although in short supply, is a substitute in some cases for even more critical metals. Nevertheless, whenever possible Navy activities are recommending products that do not use zinc. The Bureau of Yards and Docks is calling for paint coatings or plate of less critical material.

Bureau of Ordnance is using steel and plastic thread protectors instead of zinc on certain rocket ammunition.

Alloy Metals—These are among the most critical of the defense metals. The Bureau of Ships is actively studying the uses of its alloy steels to determine if boron-treated steels can be substituted, and several items have been approved.

The Bureau of Yards and Docks also specifies boron-treated steels or carbon steels where practicable, or specifies alloy steels with a minimum of alloying elements.

This department also has asked all activities to hold the use of beryllium-bronze to a minimum in springs, diaphragms and other uses in new designs. Existing specifications are being reviewed on major uses and larger sized items such as clutch rings, diaphragms and electric motor and solenoid components to determine if other materials can be substituted. These possible substitutes include aluminum-bronze, phosphor-bronze, silicon-bronze and other nonferrous alloys instead of beryllium-bronze in nonsparking tools, bearings and castings.

Boron Steels — The Bureau of Aeronautics co-operates with the Aircraft Industries Association in the procurement of five grades of boron-treated steels of aircraft quality, but no boron steels of this quality have yet been made.

Currently the bureau has obtained some commercial grades of boron-treated steel for physical testing at the Naval Air Material center.

This bureau also is developing heat-resisting nickel-base casting alloys to replace the high cobalt casting alloys now in use. Some alloys show promise, but results are still inconclusive.

The Bureau of Aeronautics is discouraging the use of columbium-bearing stainless steels in aircraft. In most cases they have been replaced by the titanium-stabilized types.

The Bureau of Ordnance is substituting stainless steels for alloy steels and bronze, low carbon for high carbon steel, is redesigning certain ordnance to eliminate parts that require critical materials, and is continuing research to eliminate, substitute or reduce the use of nickel, molybdenum, aluminum and cobalt.

Scrap—The Navy established a salvaging and refining program for lead scrap in 1946. This is continuing, and programs have been initiated for copper and copper-base alloy scrap, super alloys for aircraft jet engines and nickel. Programs are underway for salvaging, segregating and disposing aluminum, nickel-bearing steel, ordinary steel and tin can scrap.

Records of the Office of Naval Material show that the collection of ferrous scrap at Naval installations has increased from approximately 8000 tons in June of last year to 20,000 tons in December.

ASTM Features Metal Powder

Technical feature of the spring meeting, American Society for Testing Materials, will be a symposium on testing metal powders and metal products. The society meets Mar. 3-7 at Hotel Statler, Cleveland, for its annual spring session and committee week. Metal powder conference is Mar. 5, chairmanned by F. V. Lenel, department of metallurgical engineering, Rensselaer Polytechnic Institute.

Papers comprising the symposium are as follows: Methods and Devices for Testing Sintered Iron Rotating Bands; Permeability and Strength of Porous Stainless Steel Compacts; Survey of Methods for Testing Cemented Carbide Compositions; Particle Size Measurement of Metal Powders by Air Elutriation; Particle Size Determination in Metal Powders; and Quality Control of Powdered Metal Gears.

Presses Aid Air Force

Considerable man-hour and labor cost savings are promised under the Air Force's heavy press program. Short production runs on an 18,000-ton press have shown up to 50 per cent savings on the 30,000 milling machine hours required for one jet fighter. Both die forging and extrusion presses are included in the program which will turn out airframes for the Air Force and Navy.

Surveys of the aircraft industry show the need for presses up to 50,000 tons. The surveys included parts now manufactured as large forgings and those which would convert to forgings in future production.

STOP RUST!

with

RUST-OLEUM

Protects Tanks, Pipes, Girders, Metal Sash, Fences, Roofs and Buildings, Rail and Marine Facilities

BEAUTIFY AS YOU PROTECT—ALL COLORS, ALUMINUM AND WHITE!

RUST-OLEUM may be applied directly over *rusted surfaces without removing all the rust!* Just remove rust scale and loose particles with wire brush and sharp scrapers . . . then apply by brush, dip, or spray. Costly sandblasting and chemical pre-cleaning are not usually required. Easy as that to cut your maintenance costs. Specify **RUST-OLEUM** to your painting contractor or architect for *every rustable* metal surface! Prompt delivery from Industrial Distributor stocks in principal cities.

RUST-OLEUM CORPORATION
2532 Oakton Street • Evanston, Illinois

FREE SURVEY: A **RUST-OLEUM** specialist will gladly survey your rust problems. He'll make specific tests and recommendations. No cost or obligation. See Sweets for complete catalog and nearest **RUST-OLEUM** distributor, or write for literature on your company letterhead.

Stopping Rust with
RUST-OLEUM
769 D. P. Red Primer

CLIP THIS TO YOUR LETTERHEAD
MAIL TO: RUST-OLEUM CORPORATION
2532 Oakton Street • Evanston, Illinois

- ☐ Have a Qualified Representative Call
- ☐ Full Details on Free Survey
- ☐ Complete Literature
- ☐ Nearest RUST-OLEUM Source

Look for this label — be sure it's genuine RUST-OLEUM

BLAST FURNACE PRACTICE VI(b)

Generation, Recovery and Use of Heat

Blast furnace operation is likened to gas producer operation. Evidence shows the principles of the lime kiln and of the gas producer work simultaneously in the furnace shaft, and those of gas producer and slag formation work simultaneously in the hearth and bosh

IRON blast furnaces are commonly recognized as being giant gas producers and therefore in the gas producing phase of furnace operation, principles of the gas producer will govern the production of gas, independent of other phase reactions.

If a blast furnace is visualized filled with coke only and producing gas only, the principles of gas producer operation are easily recognized. Bureau of Mines research[2] proved the location and approximate dimensions of the coke combustion zone of the blast furnace (Fig. 6, Part IV). In that zone coke carbon is burned to CO_2 which immediately reverts to CO when the products of combustion come into contact with incandescent coke in the region immediately adjacent to the combustion zone. Adjacent to the nose of the tuyeres, and over a distance of about 25 inches toward the center of the furnace, formation of CO_2 predominates. Joseph and Neustaetter[4] clearly describe these reactions as follows:

1. $C + O_2 = CO_2$, + 14,580 Btu /lb C. Beyond 25 inches from the point of entrance of the blast the CO_2 reacts with coke according to the following equation;

2. $CO_2 + C = 2CO$ − 5830 Btu /lb C. This reaction, generally called the "producer gas" reaction but referred to as "solution loss" in blast furnace literature, is completed when the gas stream has traveled 40 to 50 inches from the tuyeres. The net effect chemically and thermally of reactions 1 and 2 follows;

3. $2C + O_2 = 2CO$, + 4370 Btu /lb C. Air contains varying amounts of moisture which consumes carbon before the tuyeres, according to well known water gas reaction;

4. $H_2O + C = H_2 + CO$, − 4300 Btu/lb C. Moisture in the blast thus increases the concentration of CO and H_2 in the gas issuing from the combustion zone but does so at the expense of heat normally needed to maintain the crucible temperature.

Temperature Maintained—With the thermal reactions described a temperature well above 2700°F is maintained in the bosh of the furnace, and gradually diminishing temperatures in the shaft of the furnace, as gas rising from the bosh transmits its heat to stock. In every blast furnace operation there is a zone where the temperature is too high to permit existence of CO_2 because of its immediate reversion to CO (reaction No. 2). This zone may be assumed to be between the coke combustion zone and some plane below Plane No. 4 (Figs. 1 and 2, Part I), presumably about the mantle.

According to Clement, Adams, and Haskins[10], only a small amount of CO_2 reverts to CO at 1652°F but at 2012°F the reaction rate is much faster. From this authority we can assume the temperature at the assumed plane at the mantle to be somewhere between 1652 and 2012°F. Above this plane, and virtually to the top of the furnace, the temperature is high enough at all times to permit the reaction of CO and O to form CO_2 but not high enough to cause reversion of CO_2 to CO. Obviously, the higher in the furnace the high temperature plane exists the greater will be the opportuity for reversion of CO_2 to CO and, consequently, for a greater carbon solution loss.

Reasoning from the basis of the thermal reactions described the furnace which we have visualized filled with coke only, and producing gas only, would produce gas in which carbon exists largely as CO_2

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

McKee builds the plants that produce them

IT'S virtually impossible to find a place where steel is used without the use of some petroleum product in its production, fabrication or operation. It is just as hard to name a use for gasoline or oil without steel in the picture.

Steel and Oil—these are industry's "inseparables" and they are needed today in greater quantities than ever before.

The McKee organization has designed and built hundreds of plants in the United States and some 25 foreign countries and is now engineering new facilities which will account for a definite increase in the production of iron and steel and petroleum products.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE IRON AND STEEL AND PETROLEUM REFINING INDUSTRIES

McKee Engineering

Arthur G. McKee & Company • Established 1905

Headquarters: McKee Building, 2300 Chester Avenue, Cleveland 1, Ohio.
New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:* 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma.

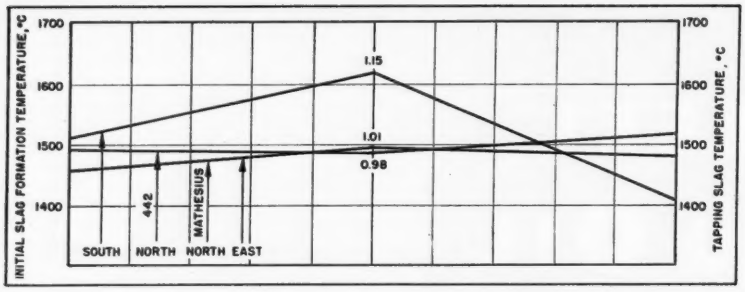


Fig. 9—Minimum basicity temperature ratio to tapping temperature

at the tuyeres, entirely as CO in the high-temperature zone of the bosh, and will continue to exist as CO in the zone above the assumed limiting high-temperature plane in the bosh unless additional oxygen (O_2) is supplied to cause conversion to CO_2. If oxygen is injected into the mass of incandescent coke in the high-temperature zone of the bosh, CO_2 will be formed but will immediately revert to CO in exactly the same manner as it does when products of combustion leave the combustion zone at the tuyeres (reactions 1 and 2), and will cause "carbon solution loss." If oxygen is injected into the coke mass above the assumed limiting high-temperature plane in the bosh, CO_2 will be formed, but instead of reverting to CO, it will pass from the furnace as CO_2. With this reaction ($CO + O = CO_2$) heat will be generated to the extent of 10,210 Btu/lb C.

Reasons for Variations — With the conditions described it is reasonable to assume the only variation which can occur in thermal reactions, or in amount of carbon solution loss, would be caused by changing the location of the assumed limiting high-temperature plane in the bosh, or by varying the amount of oxygen injected into the coke mass between the combustion zone and the limiting high-temperature plane. It is reasonable to assume the location of that plane and the consequent depth of the high-temperature zone, will vary with the thermal conditions created in the bosh by the formation of slag, and by the volume of air blown into the furnace. The reason for this is that the mineral composition of slag determines the critical temperature which must be maintained in the bosh and hearth, and the volume of gas rising from the bosh determines the amount of heat carried up through the furnace shaft.

If to this imaginary gas-producing operation enough limestone is added to flux the coke ash, complexity is imparted to the operation by introducing operating principles of the lime kiln into the furnace shaft, and chemical principles of slag formation into the bosh and hearth, without changing any principles of the gas producing operation. Calcination of limestone releases CO_2 ($CaCO_3 = CaO + CO_2$), consumes 1850 Btu per lb CO_2, and therefore has a cooling effect in the shaft. If any limestone descends to the high-temperature zone in the bosh before being calcined, the CO_2 released there must react with incandescent coke carbon in the same manner as CO_2 formed from the injection of oxygen, or as CO_2 formed at the tuyeres, because this reaction is subject to the principles of gas producing operation, the source of CO_2 being immaterial.

Fusion and formation of slag from coke ash and calcined stone is a chemical reaction independent from gas production and is governed by entirely different principles even though the two operations are carried on simultaneously. With the conditions described we have principles of the lime kiln and of the gas producer working simultaneously in the furnace shaft, and principles of the gas producer and of slag formation working simultaneously in the bosh and hearth.

Problem Is Enlarged—Again, if to this imaginary gas producing operation ore containing iron oxide and gangue is added, and the weight of limestone is increased to flux both coke ash and ore gangue, we further add to complexity of the combined operations without changing the principles of gas producer operation. More stone will be calcined, more slag will be formed, and the fourth operation of reducing and smelting iron will be added to the combination of operations without changing any principles governing the calcination of limestone, formation of slag, or production of gas. With the addition of iron ore to this imaginary operation, iron oxides supply oxygen to zones above the coke combustion zone which was first supplied through a lance, but principles governing the production of gas remain the same.

With coke only in the furnace, the depth of the high-temperature zone, and the amount of oxygen injected into the zones above the coke combustion zone, were the only variables which could affect thermal conditions governing gas producing reactions. The addition of limestone and iron ore introduces further variables of raw material chemical composition and physical properties with their respective influences on thermal requirements of furnace operation but the principles of gas producing operation remain the same.

As indicated by the comparative data in the three thermal balance calculations presented in Part VIa, the *volume of heat* required for furnace operation can vary greatly between furnaces because of differences in the character of the raw materials used. The data also indicate that bosh and hearth *temperature conditions,* in normal operations having near neutral slag chemical composition, do not, or need not, vary greatly. All that is needed for any given operation is sufficient *volume* of heat *at* the temperature required for effecting the necessary chemical reactions.

Range of Variations Differs — From the premise that chemical reactions which govern the carbon solution loss are restricted to a zone having a *limiting temperature,* and that the temperature and depth of such a zone in normal blast furnace operations do not vary greatly, it is logical to believe these conditions account for the fact that the carbon solution

ONE always stands out!

and among refractory dolomites it's . . .

BAKER'S MAGDOLITE

The acceptance of Magdolite among leading users of refractory dolomites throughout the country is the result of years of dependable service.

Magdolite's superior chemical, physical and mineralogical composition, coupled with Baker's continued research and development in the application of refractories, assure you of a minimum of maintenance and repairs.

When you buy . . . specify Baker's Magdolite . . . the logical choice in refractory dolomites.

ALWAYS 5 WAYS BETTER—Composition • Preparation • Economy • Strength • Quality

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

PLANTS: Billmeyer, Pennsylvania • Millersville, Ohio

JEBCO PRODUCTS

MAKERS OF BAKER'S MAGDOLITE

Can you match Inland Steel's performance in materials handling?

If yours, too, is *big production* business, why not profit by the experience of Inland Steel? Here, big jobs involve big money; and the systems that stay are those that deliver *highest production*.

This year Inland expects to produce about 4,500,000 tons of ingots. To handle the heaviest lifting jobs connected with that output—to handle scrap, ore, limestone and coal within the 650 acre works at Indiana Harbor—Inland depends upon American Locomotive Cranes.

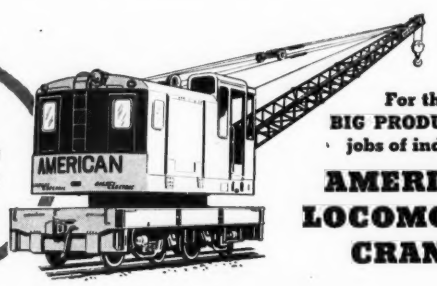
Why? Because American Locomotive Cranes can move loads that lighter equipment couldn't budge. Because they can swing, lift and travel all at once. Because their upkeep cost is unbelievably low. Because they are *completely modern* one-man machines, as different from early steam cranes as the jet plane is different from the Jenny.

Before you buy any lifting, loading or switching equipment, get comparative figures on American Locomotive Cranes. For big production, they are *always* your best buy!

19

Modernize...economize...with

American Hoist
& Derrick Company
ST. PAUL 1, MINNESOTA



For the BIG PRODUCTION jobs of industry...
AMERICAN LOCOMOTIVE CRANES

2601

loss does not vary over as wide a range as the fuel rates which accompany it because fuel rates are determined by, and vary with, the *volume of heat* required. The probability that the gas producing operation and reactions are entirely independent from other blast furnace chemical reactions serves to explain the seeming inconsistency in the amount of carbon solution loss which occurs in relation to other reactions; actually, with comparable thermal conditions in the furnace, it appears to be one of the most consistent of them all.

The foregoing reasoning appears to be fully sustained by research data of the U. S. Bureau of Mines. Table IX is a comparison of actual temperature measurements, from which reasonable assumptions may be made for operations which do not have actual measurement data. Data used from technical paper No. 442 is an average of daily data recorded during 21 days of investigation. The days recorded were not consecutive but close similarity of daily data makes use of average figures satisfactory for comparison with other furnace operations.

Fig. 9 shows graphically the relative thermal conditions in the bosh and hearth for the four operations of Table IX. The conditions are based upon calculated temperatures of slag at progressive stages of mineral composition. The Mathesius thermal balance data does not include slag composition but his Btu consumption per pound of slag indicates the composition similar to the East slag; therefore, in Fig. 9 it is assumed the slag composition of the Mathesius North operation is the same as the East. Using average temperatures of slag formation as indicative of temperature in the respective boshes and hearths the four operations check closely. Although the South and East check closely in pounds of carbon lost to solution, the two North operations, comparable in bosh and hearth temperatures to the South and East, and to each other, have the highest and the lowest carbon solution loss of the four operations compared. Table X shows data for the four operations.

(*To be continued*)

TABLE IX
COMPARISON OF TEMPERATURE MEASUREMENTS

	South[1]	North[2]	North[3]	East
	Lb/2240 Lb of Iron			
Air	9,627.88	7,536.53	6,673.00	4,548.00
Coke	2,626.85	1,942.00	1,682.00	1,350.00
Coke carbon gasified, %	1,990.30	1,669.65	1,362.96	1,061.50
Carbon burned at tuyeres	1,717.10	1,363.35	1,206.79	822.14
Consumed above tuyeres	273.20	306.30	156.17	259.36
Direct reduction Si, Mn, P	54.68	31.42	30.79	32.87
CARBON LOST TO SOLUTION	218.52	274.88	125.38	226.49
Top of furnace:				
Gas temperature, ° F	334.4	400.0	325.0	350.0
CO_2 by volume, %	9.9	14.7	14.9	14.5
CO by volume, %	28.1	24.8	23.5	28.0
Plane No. 1:				
Gas temperature, ° F	399.9	724.7	—	—
CO_2 by volume, %	10.3	14.9	—	—
CO by volume, %	27.04	25.20	—	—
Plane No. 2:				
Gas temperature, average, ° F	869.9	1301.0	—	—
Gas temperature at sidewall, ° F	—	1429.0	—	—
Gas temperature center of furnace, ° F.	—	1694.0	—	—
CO_2 by volume, %	12.14	15.20	—	—
CO by volume, %	26.50	25.30	—	—
Plane No. 3:				
Gas temperature, average, ° F	1373.0	1574.0	—	—
Gas temperature at sidewall, ° F	1364.0	1587.0	—	—
Gas temperature center of furnace, ° F.	1409.0	1800.0	—	—
CO_2 by volume, %	9.02	11.90	—	—
CO by volume, %	28.62	27.70	—	—
Plane No. 4:				
Gas temperature, average, ° F	1567.0	1727.0	—	—
Gas temperature at sidewall, ° F	1537.0	1670.0	—	—
Gas temperature center of furnace, ° F	1661.0	1890.0	—	—
CO_2 by volume, %	1.10	5.50	—	—
CO by volume, %	33.60	34.70	—	—
Tuyeres:				
Gas temperature, ° F	2462.0	2372.0	—	—
CO_2 by volume, %	0.0	0.0	0.0[4]	0.0[4]
CO by volume, %	34.1	32.0	—	—

[1] Technical Paper No. 391, U. S. Bureau of Mines.
[2] Technical Paper No. 442, U. S. Bureau of Mines.
[3] Mathesius.
[4] Assumed.

TABLE X
COMPARISON OF OPERATING DATA

	South[1] Southern ore	North[2] Lake ore	North[3] Lake Ore	East Sintered concentrates
Average tons iron per day	324.7	709.0	572.0	715.0
	Materials Charged/2240 lb of Iron			
Ore	4203.00	4220.00	4057.00	3450.00
Coke	2626.85	1942.00	1682.00	1350.00
Air	9627.88	7536.53	6673.00	4548.00
Stone	1226.85	740.00	795.00	300.00
Slag	1786.47	984.00	1010.00	898.00
Flue dust	277.86	?	89.00	90.00
Burden ratios:				
Ore/coke	1.60/1.00	2.17/1.00	2.41/1.00	2.55/1.00
Ore+scrap/coke	1.73/1.00	?	2.44/1.00	2.78/1.00
Ore+stone+scrap/coke	2.20/1.00	2.55/1.00	2.91/1.00	3.00/1.00
Fe reduced from oxides, lb	1755	2085	2085	1802
Fe in ore mix, %	43.28	51.03	51.19	54.55
Coke analyses:				
Volatile matter, %	0.49	1.21	1.35	0.50
Fixed carbon, %	84.93	90.09	89.00	90.00
Ash, %	13.48	8.69	9.40	8.65
Sulphur, %	1.07	0.60	0.59	0.85
	99.97	100.59	100.35	100.00
Silicon in iron, %	2.01	1.24	1.35	1.00
Average blast temp., ° F	957° F	1140° F	1248° F	1550° F

[1] Technical Paper No. 391, U. S. Bureau of Mines.
[2] Technical Paper No. 442, U. S. Bureau of Mines.
[3] Mathesius.

BIBLIOGRAPHY

[3] Technical Papers, Nos. 391, 397, 425 and 442, U. S. Bureau of Mines.

[4] "Use of Carbon in the Blast Furnace and Heat Balances," by Joseph and Neustaetter. *Blast Furnace and Steel Plant*, July and August 1947.

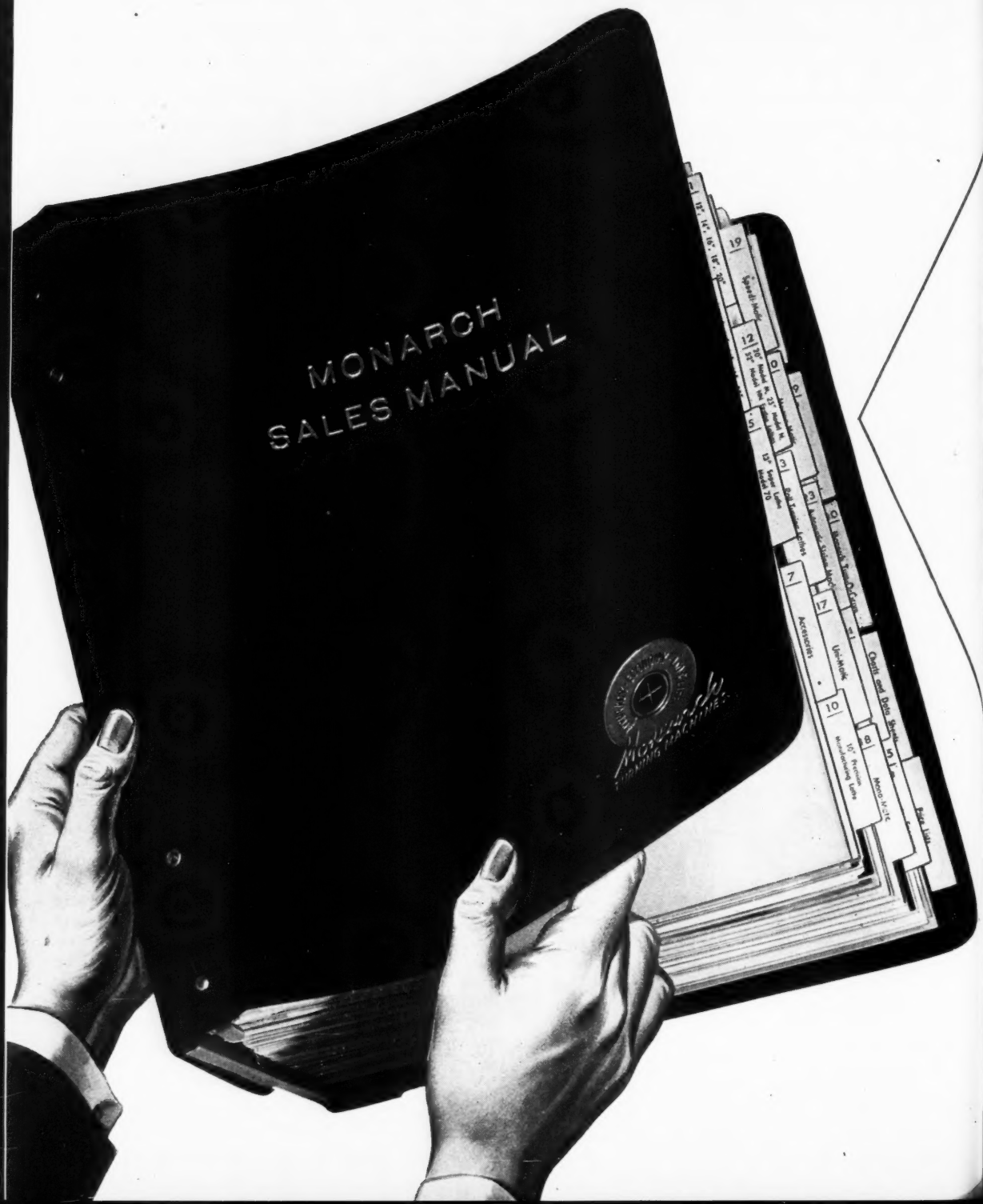
[10] Bulletin No. 7, 1911, by J. K. Clement, L. H. Adams and C. N. Haskins, U. S. Bureau of Mines.

Correction

In Part IV, presented Feb. 4, page 98, the paragraph beginning with "This temperature . . ." should read:

This temperature is determined by the need for conservation and concentration of heat in the slag of the lower bosh to the amount required to assimilate the ash released from coke with the carbon combustion at the tuyeres, without disturbing the free-running property of slag tapped from the furnace, while at the same satisfying the thermal requirements for chemical reactions within the bosh, and the drainage of heat from the upper bosh by gas entering shaft.

Call on *Monarch* and You C



Call the Turn

When the Monarch man opens *this* manual on your desk, he's ready, as you can see, to talk *every* phase of metal turning. With it, he can *show* you—with copious illustrations, specifications and job reports—just how Monarch machines and Monarch methods deliver peak production at a profit.

WHAT'S YOUR IMMEDIATE INTEREST?

A SMALL, SENSITIVE, PRECISION MACHINE for fast output of smaller work? We've got it in toolroom and production line versions—our famous 10" Model EE!

A TRULY DUAL-PURPOSE LATHE with equally high precision and productiveness ratings? One capable of bringing toolroom standards to production and manufacturing output to the toolroom? That's our great new 13" Model EE Precision Lathe!

TOOLROOM LATHES tested and proven for precision, metal removing capacity, ease of operation and prolonged service? You'll find 13", 16" and 20" sizes in our Series 60 Line.

ENGINE LATHES as effective in repetitive high-speed production turning as in easily-set-up maintenance work? Here's the blue-blooded workhorse of the Monarch Series 60 line, also in 13", 16" and 20" sizes.

HEAVY DUTY LATHES—with emphasis on capacity, power, ability to "take it" combined with accuracy, high finish and operational convenience? Yep, we've got them too—in the 20" M, 25" N and 32" NN.

TRACER CONTROLS? That's our baby! Only Monarch offers *three* kinds applicable to most Monarch Lathes—the Air Gage Tracer, Monarch-Keller, and Motor Trace Controls. See how the tracer-controlled single tool turning principle saves machining time, setup time, grinding and tooling on long and short runs.

HIGH-PRODUCTION LATHES? Bull's-eye again! See the Air Gage Tracer-controlled Mona-Matic for high-speed, automatic cycle metal turning at an output rate unmatched by other machines. Or the productivity, accuracy, and ease and quickness of setup of the electronically controlled Speedi-Matic.

SPECIAL PURPOSE MACHINES? There's the new T Lathe. There's the Heavy Duty Roll-Turner which, with Keller Controls, contour turns rolls up to 25" diameter. And there's the Shapemaster Engraver that will reproduce externally, internally or on a face, any design which can be touched by the point of a tool.

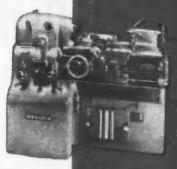
Yes, this sales manual does literally cover the turning field. It's a permanent part of your Monarch man's kit, and he'll gladly go into it with you on his next call. Or—if you want complete component booklets on any single Monarch product for your files, write and indicate your interests. It's your turn now! . . . *The Monarch Machine Tool Co., Sidney, Ohio.*

Monarch

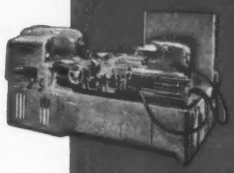
ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

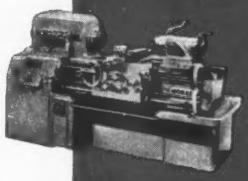
FOR A GOOD TURN FASTER . . . TURN TO MONARCH



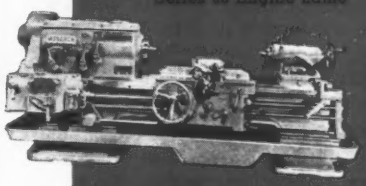
10" EE Toolmaker's Lathe



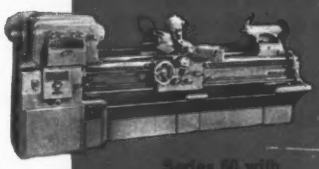
13" EE Precision Lathe



Series 60 Engine Lathe

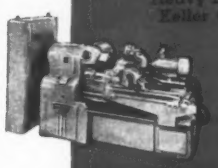


Heavy Duty Lathe



Series 60 with Air-Gage Tracer

Heavy Duty with Keller Controls



The Mona-Matic

The Speedi-Matic

Tank Turret Ring Output Time Slashed

Surplus machine retooled for ordnance job broaches 294 teeth in 6-foot tank turrent rings in 30 minutes. Reduced capital outlay and quick delivery are other benefits

RETOOLING a World War II surplus Colonial broaching machine to cut 294 internal 4-pitch teeth is saving $400 per day in the production of 6-foot turret ring gears at Army Ordnance's Detroit Arsenal. Production engineers at the arsenal and Colonial Broach Co., Detroit, not only found a way to get around the long delivery time for new machine tools but developed a process that cuts machining time from 4½ hours to 30 minutes.

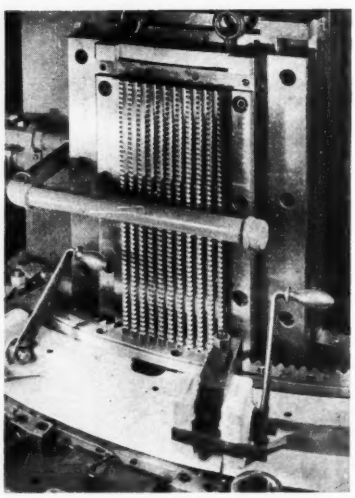
Ordnance officials believe at least as much will be saved proportionately as other machines are installed. Other benefits claimed are elimination of three-fourths of the capital outlay and seven-eighths of the number of machine tools required formerly.

Special Holder—To permit the broaching of the teeth in the large ring, Colonial engineers designed a huge index fixture that encircles the 30 ton, 66-inch stroke vertical broaching machine. Broaching of the 294 teeth is done by a combination of indexing and shuttle movement of the fixture. In operation the fixture moves into cutting position under an 11-tooth, 12-segment surface broach 9 inches wide by 60 inches long. After the broach has been passed through the work, the fixture moves out of cutting position and the broach is returned to the top of its stroke. Shuttle movement is accomplished through a hydraulically controlled locking cam action.

Indexing of the turret ring to the next cutting position is by hydraulic cylinders. These rotate the part in the fixture to the next position where a hydraulically controlled index pin locks the fixture in accurate indexing location. The turret ring is clamped in the fixture by hand clamps and is ejected hydraulically for unloading. Selection of an 11-tooth broach was dictated by the capacity of the machine available at the time.

Integral Checking — Teeth formed by the broaching operation are checked while the part is still in the machine. Gage that checks the part both for tooth spacing and size is integral with the index fixture and actually passes through the column of the machine.

Colonial turret ring gear tooth broaching machine in operation. One of the fixture index hydraulic cylinders is at the right of the operator. Entire operation requires about 30 minutes



Closeup of the broaching operation at the last index position. Coolant pipe is located directly above tooth contact. Two part clamping handles mounted on fixture are visible in foreground

Gear data for the teeth on the turret ring is: 294 teeth, 4 pitch, 25 degree pressure angle, 73.5 inches pitch diameter, 0.525-inch depth, 1.385 inches face width. The teeth are held to a tolerance of 0.001-inch spacing by the broaching operation.

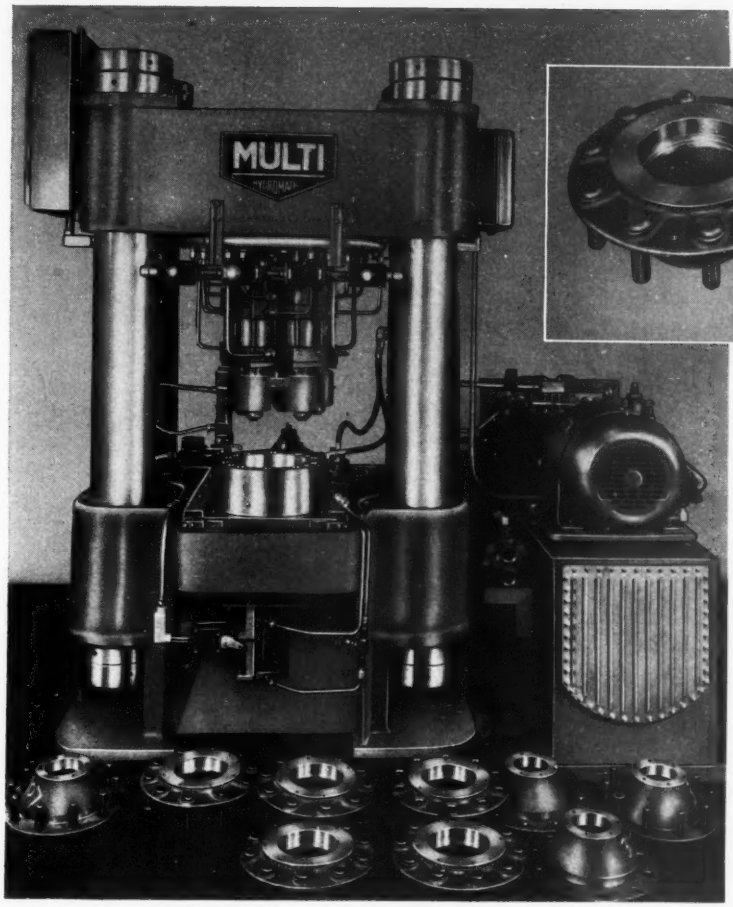
To produce the part to these tolerances required high precision in machining the fixture. Eccentricity on the assembled fixture is less than 0.0005-inch per foot of diameter. The broaching machine used actually is a surplus single ram vertical broaching machine, rebuilt to accommodate the 4-ton index fixture. Hydraulic power equipment that was formerly within the column of the standard machine is now mounted on a base at the rear of the machine to facilitate fixture mounting and provide additional hydraulic and electrical control functions.

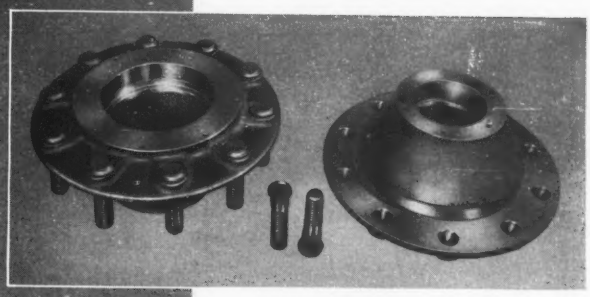
The machine currently operates on a semiautomatic cycle in which the indexing function is controlled independent of the machine operation. To produce the broach itself to the close tolerances required by the operation, Colonial developed special grinding and checking equipment. Accuracy of the broached teeth is so high that no subsequent finishing is necessary.

Metal Powder for Ordnance

"Powder Metallurgy in a Defense Economy,"—theme for the annual meeting, Metal Powder Association, will be executed by a definition of applications of powdered metallurgy in the ordnance program. Scheduled Apr. 29-30 at the Drake Hotel, Chicago, the session includes exhibits of metal powder processing equipment and products.

Subjects to be discussed include iron powder rotating bands, brass and iron powder fuse mechanism components, small arms ammunition, jet engine blades and vanes, carbide core penetrating tips for armor-piercing projectiles and iron powder electronic core materials used by the Signal Corps. Other papers will cover new developments in techniques and application.





NEW!

A mighty press that simplifies DIFFICULT ORDNANCE PRODUCTION PROBLEMS

This is the heavy duty, completely gutomatic hydraulically actuated 300-ton press for assembly of serrated studs to hubs. Photo at top right shows a close view of the studs pressed into the hubs. This group represents only a few seconds production time.

Designed to take up as little space as possible, this heavy duty, completely automatic hydraulically actuated 300-ton press presses five thousand serrated studs into hubs in the course of eight hours! This is possible because the operating cycle permits the assembly of five studs at a time. Sequence of operation: fixture loads in out position—moves under ram—five studs are pressed in—fixture indexes—remaining five studs pressed in—fixture moves out—part automatically ejected. Quick and simple. The various factors in this press—large capacity hydraulic power unit, oil cooler, 2-stage pump, etc. Production costs can be whittled down amazingly. The press can be made with variations adaptable to your production problems. Write or wire inquiries today.

The *Multi-Hydromatic* Welding & Mfg. Co. (Est. 1930)

23171 GROESBECK HIGHWAY • EAST DETROIT, MICH.

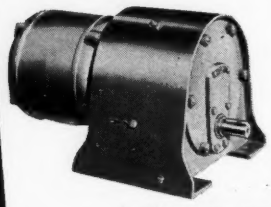
REPRESENTATIVES IN PRINCIPAL CITIES AND THE DOMINION OF CANADA

MULTI HYDROMATIC

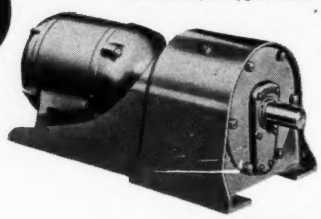
For All Kinds of
Slow Speed Requirements

Specify
Century GEAR MOTORS
Rugged, Quiet,
Long Life Operation

⅛ to ¾ HP Type 2R gear motor. 4.3 to 125 RPM double gear reduction right angle shaft.



1 to 50 horsepower, gear motor.



1 to 50 horsepower, all motor type gear motor.

1 to 50 horsepower, vertical all motor type gear motor.

There are dozens of reasons why Century gear motors assure satisfactory performance day after day. Here are a few of them:

Simple design, coupled with accurate machining and rugged construction, produces a rugged unit that stays in alignment.

Precision gear cutting assures quiet operation.

Streamlined design provides improved appearance and smooth easily cleaned surfaces inside and out.

Century Gear motors are available in a wide range of types and sizes from ⅛ to 50 horsepower—in a variety of speeds. Other Century motors are available in a complete range of types and sizes from ⅛ to 400 horsepower. Specify Century motors for all your electric power requirements.

2 to 3 HP gear motor Single gear reduction right angle shaft.

⅛ to ¾ HP Type 1R gear motor. 25 to 250 RPM single gear reduction right angle shaft.

1 to 1½ HP Type 1R gear motor. 37 to 280 RPM single gear reduction right angle shaft.

-892

CENTURY ELECTRIC COMPANY 1806 Pine St., St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

Century C MOTORS

Process Spurs Mica Insulation

A development that permits use of domestic mica for a variety of electric insulating applications may free the industry from dependence on Indian imports. Key to the work is a special process announced by General Electric Co.'s Chemical Division that treats mica flakes so a force is generated which holds the tiny particles together.

Resulting product forms a continuous sheet in thicknesses ranging from 0.002 to 0.006-inch. Robert L. Gibson, division general manager, says this sheet has better dielectric strength than present machine and hand-laid products. He attributes these improved properties to greater uniformity of thickness and absence of voids.

Called GE micamat, the product is undergoing pilot plant tests at the company's Transformer & Allied Products Division laboratory in Pittsfield, Mass. Commercial production is planned for first quarter of 1952 on an installation to be operated at the Chemical Division plant in Coshocton, O.

Mr. Gibson reports that the micamat tapes and sheets can be impregnated with resins and bonded to paper, glass and cloth for greater strength and improved electrical properties. He sees uses through molding the insulator into shapes for motors and generators, machine wrapping on bars and cable or applying in heating devices.

Guide Fixes Machined Surfaces

A standard to guide designers, inspectors, and specification writers in designating the type of machined surface desired on industrial products has been approved by American Standards Association, New York. This document is the American Standard for Physical Specimens of Surface Roughness and Lay (B46.2-1952).

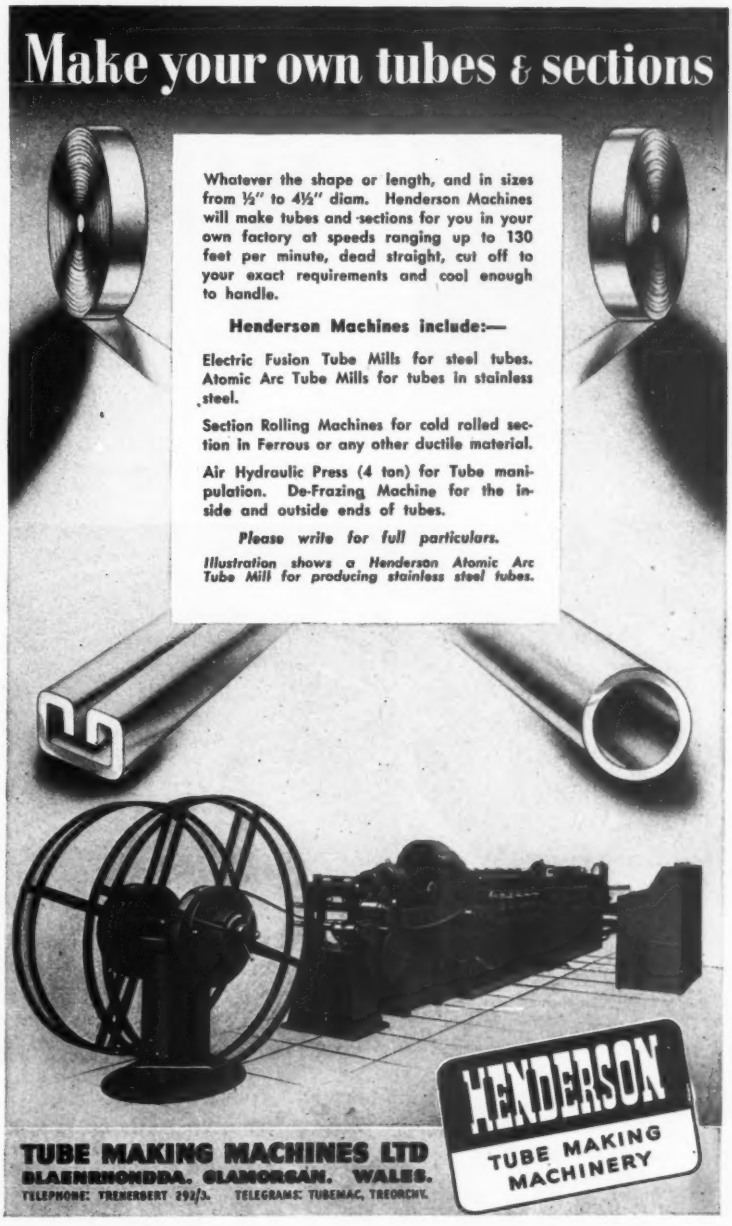
Two types of physical specimens are described: One is for general purpose specimen blocks—those that represent typical machined flat surfaces as actually produced in the shop. The other is used for precision reference work, such as checking calibration of surface roughness measuring instruments. It is not intended to represent surfaces as produced in the shop by actual machining.

Copies are available from the association, 70 E. 45th St., New York 17, or from the American Society of Mechanical Engineers, 29 W. 39th St., New York.

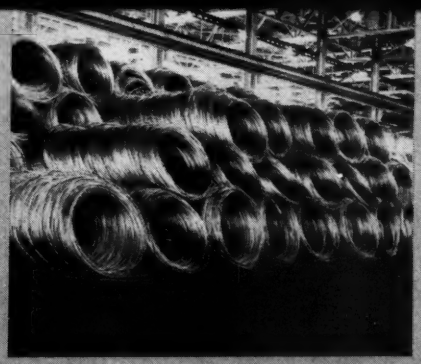
Handling Dividends Noted

Mechanized materials handling at the American Brass Co. plant in Torrington, Conn. is paying off in increased speed, versatility and ease of maintenance. Billets are unloaded from a 100,000-pound car in as little as 90 minutes. Electric trucks are used to load stamped brass blanks into railroad cars; to handle palletized rolls of sheet metal; in the tube department to lay up stock in drawing machines; to dispose of scrap metal; and to move materials in the casting shop. Maintenance is 75 to 80 per cent less than with other handling methods.

Production in this group of buildings, most of which are single

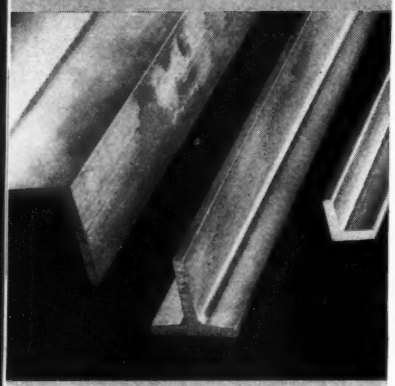

Make your own tubes & sections
Whatever the shape or length, and in sizes from ½" to 4½" diam. Henderson Machines will make tubes and sections for you in your own factory at speeds ranging up to 130 feet per minute, dead straight, cut off to your exact requirements and cool enough to handle.
Henderson Machines include:—
Electric Fusion Tube Mills for steel tubes. Atomic Arc Tube Mills for tubes in stainless steel.
Section Rolling Machines for cold rolled section in Ferrous or any other ductile material.
Air Hydraulic Press (4 ton) for Tube manipulation. De-Frazing Machine for the inside and outside ends of tubes.
Please write for full particulars.
Illustration shows a Henderson Atomic Arc Tube Mill for producing stainless steel tubes.
HENDERSON
TUBE MAKING MACHINERY
TUBE MAKING MACHINES LTD
BLAENRHONDDA. GLAMORGAN. WALES.
TELEPHONE: TREHERBERT 292/3. TELEGRAMS: TUBEMAC, TREORCHY.

SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



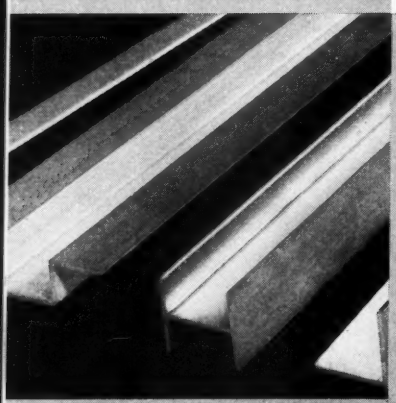
WIRE: Coiled and straight lengths; rivet wire; flattened and slit wire.

SCREW MACHINE STOCK: All free-cutting alloys plus the higher strength alloys—24S, 61S and 75S.

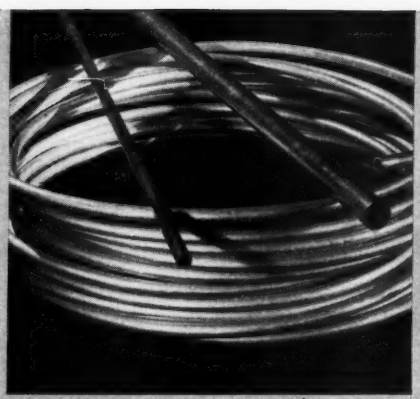


ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; H-beams; Tees; Zees.

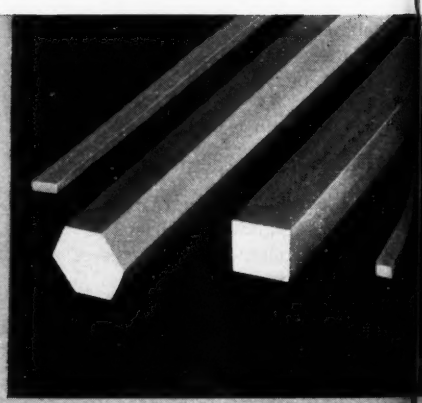
These are the MILL PRODUCTS *of* ALCOA



EXTRUDED SHAPES: Miscellaneous extruded shapes such as angles, channels, half rounds, quarter rounds, thresholds, truck corners, structural members, etc. Round, square, and rectangular bars.



TUBE AND PIPE: Coiled tube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; irrigation pipe; rigid conduit.



BAR STOCK: Square, hexagonal and rectangular bar stock in free-cutting and higher strength alloys.

"SEE IT NOW," with Edward R. Murrow, brings the world to your armchair...CBS-TV every Sunday--3:30 P.M. EST

ALUMINUM COMPANY OF AMERICA

They have these 12 basic advantages and scores of others

• Light Weight • High Resistance to Corrosion • High Electrical Conductivity • High Conductivity for Heat • High Reflectivity for Light and Radiant Heat • Workability • Non-Toxic • Strength in Alloys • Non-Sparking • Non-Magnetic • Appearance • High Scrap and Re-Use Value

They are available from your local ALCOA sales office, distributor or jobber, subject to government regulations

For help in interpreting government regulations and all possible co-operation in filling your rated orders, call on your local Alcoa sales office, distributor or jobber. You'll find them listed under "aluminum" in your classified phone book.

With them goes the skill in fabricating, assembling and finishing of 64 years of aluminum knowledge

This know-how plus the help of the world's greatest aluminum research and testing facilities is available to you through your local Alcoa sales office.

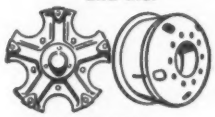
There are no restrictions on the aid and know-how that go with them

For technical literature and movies to train your personnel, for the personal help of Alcoa sales engineers, for the long-range research and testing of aluminum for your products, call your local Alcoa sales office.

ALUMINUM COMPANY OF AMERICA
1808B Gulf Building • Pittsburgh 19, Pa.

ALCOA ALSO MAKES PRODUCTS TO CUSTOMER SPECIFICATION

CASTINGS . . .
sand, plaster, permanent mold and die.

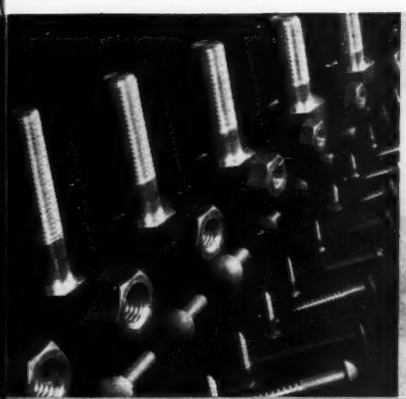


FORGINGS . . .
drop, hammer and press forgings.

SCREW MACHINE SPECIALTIES . . .
special fasteners and screw machine parts.

IMPACT EXTRUSIONS

EXTRUDED SHAPES



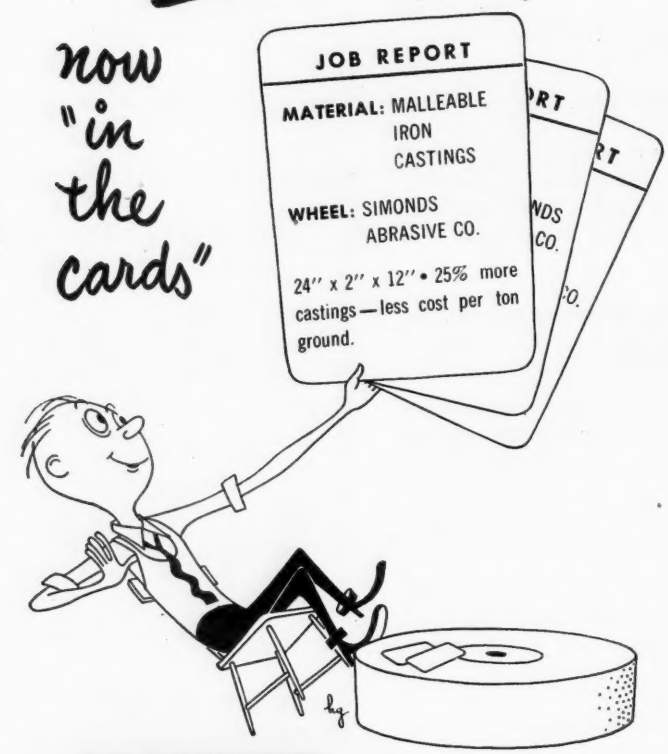
FASTENERS: Machine screws, wood screws, washers, nuts, bolts, rivets.

WELDING AND SOLDERING SUPPLIES: Welding and brazing wire, welding and brazing flux, solder flux, solder.

ALCOA *first in* ALUMINUM

ALCOA ALUMINUM

Better snagging now "in the cards"


JOB REPORT
MATERIAL: MALLEABLE IRON CASTINGS
WHEEL: SIMONDS ABRASIVE CO.
24" x 2" x 12" • 25% more castings—less cost per ton ground.

SIMONDS ABRASIVE CO.

Grinding Wheels

Take the gamble out of grinding wheel selection. Deal yourself in on top grinding performance with Simonds Abrasive Company Grinding Wheels. Complete line includes wheels of every combination of grain, grade and structure . . . wheels of all shapes and sizes . . . mounted wheels and points, segments and abrasive grains . . . industrially proved production tools backed by Simonds Abrasive Company complete quality control, expert engineering service, and 60 years experience as one of the nation's leading manufacturers of grinding wheels. Send now for free data book. Also the name of your Simonds Abrasive Company distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

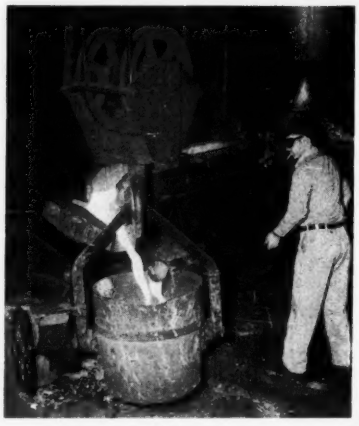
Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

story structures, is about 5 million pounds weekly. This production consists of brass sheet, strip, tube, bar and stamped blanks. Transportation equipment has been added through the years. Oldest item is a tractor dating back to 1916. This tractor shoves 30,000-pound rail cars around in the casting shop. Platform transporters in the scrap department bring bins of punched-out sheet to overhead cranes for removal to furnaces. Two 4000 to 8000-pound low lifts move about 150 tons a day of scrap brass and alloys for mixing into various types of brass. In congested areas where operator speed may be a hazard, the slower driver-led transporters are used.

Underwriters List LP-G Engines

Motor Truck Division, International Harvester Co., Chicago, is introducing factory-built liquefied-petroleum-gas powered engines on its trucks as Underwriters Laboratories listed equipment. W. K. Perkins, motor truck sales manager, says the company's approved propane-butane units are optional on all models equipped with heavy-duty engines. These include the LP-185, 195 and 205 Roadliners and all other models in the L-185 through LF-210 series.

Mr. Perkins reports higher com-



PRESET PROPERTIES: First heat of metal cast with Meehanite process controls by De Laval Steam Turbine Co. is tapped at the Trenton, N. J., foundry. The company expects to produce about 25 tons of castings daily with properties predetermined to meet exact specifications

Continental

ALLOY BAR MILL

Rolling Mill installations engineered complete

for steel, alloy and non-ferrous metals

BLOOMING MILLS
STRUCTURAL MILLS
RAIL MILLS
BILLET MILLS
ROD MILLS
BAR MILLS
MERCHANT MILLS

★ ★ ★

SLABBING MILLS
UNIVERSAL MILLS
PLATE MILLS
HOT STRIP MILLS
COLD STRIP MILLS
TEMPER MILLS

★ ★ ★

Mills complete with Auxiliary Equipment

★ ★ ★

ROLL LATHES

★ ★ ★

SPECIAL MACHINERY

★ ★ ★

CASTINGS—carbon and alloy steel from 20 to 250,000 pounds

ROLLS—iron, alloy iron and steel rolls for all types of rolling mills

CHICAGO • PITTSBURGH

Plants at:
East Chicago, Ind.
Wheeling, W. Va.
Pittsburgh, Pa.

CONTINENTAL
Foundry & Machine
Company

REPUBLIC UPSON SEMI-FINISHED AND COLD-PUNCHED NUTS

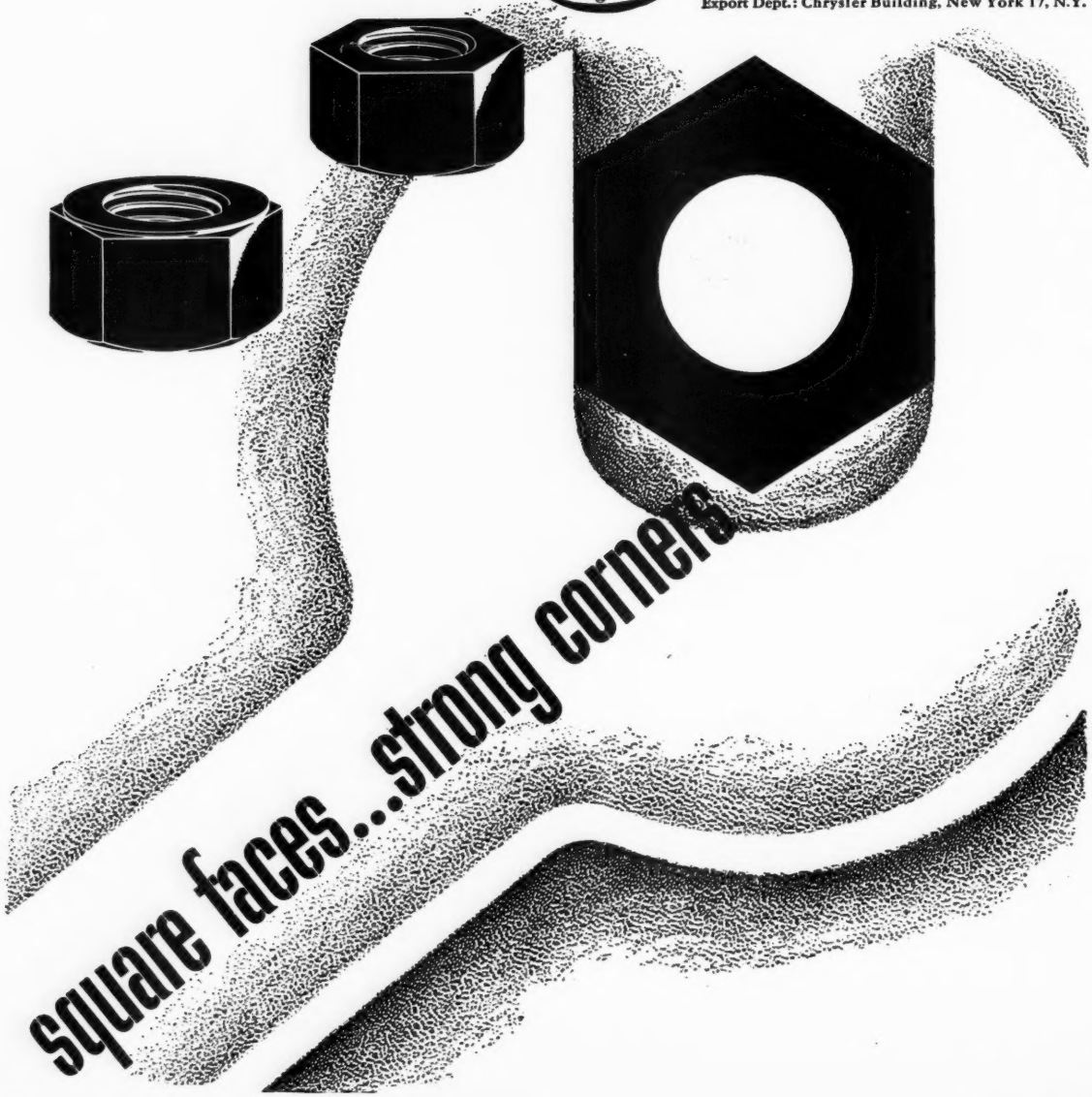
Wrenches fit Republic Upson Nuts squarely, snugly. There's less chance for slipping, less chance for deformation and rounding-off of nut corners.

Accurate, clean threads speed-up assembly, assure full thread area to grip uniformly and tightly.

More than 20,000 types, sizes, and shapes of Republic Upson Nuts and Bolts let you provide your product with the long-lasting advantages of these top-quality fasteners.

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
CLEVELAND 13, OHIO • GADSDEN, ALABAMA
Export Dept.: Chrysler Building, New York 17, N.Y.



pression ratios possible on the new engines result from high octane qualities offered by LPG. He adds the company takes advantage of propane-butane's combustible qualities which form no sludge or gummy deposits by incorporating special carburetion, cold manifolding and other refinements in the production designs.

Cold induction system free from hot spots necessary for gasoline types was effected by divorcing intake and exhaust manifolds completely, eliminating the connection as it exists in standard engines. Standard gasoline tanks are replaced by heavier, dual, 62-gallon liquid measure tanks—also Underwriters listed. Average distance possible between refuelings on this capacity is 400 miles.

X-Ray School Sessions Set

Twelfth x-ray diffraction school sponsored by North American Philips Co. Inc., is scheduled for Apr. 21-25 at the company's Mt. Vernon, N. Y., plant. Basic subjects on the agenda are new high and low temperature camera techniques, fluorescence analysis, the Geiger-counter x-ray spectrometer, electron microscopy and diffraction and x-ray diffraction. On the last day, guest speakers will discuss application problems, giving methods that play important functions in industrial laboratories and plants.

AWS Offers Safety Revisions

Severe explosions and fires may result if welding, cutting or other hot work is done on containers not entirely free from combustibles. Containers of this kind can be made safe at low cost, but necessary steps and precautions must be followed rigidly. No container is presumed to be clean or safe until proved so by proper tests.

So says the American Welding Society in introducing its revised edition of "Safe Practices for Welding and Cutting Containers that Have Held Combustibles". This revision of a standard first issued in 1940 treats general precautions, hot chemical and steam cleaning methods. It describes safety steps to take while actual welding or cutting takes place. An appendix covers apparatus to use for gas testing to make sure the contain-

CLEVELAND
Top Quality
fasteners
for particular
fastener users
Cap Screws
Hex (bright and high carbon),
Socket, Flat Socket, Fillister, Flat
Set Screws
Square head, cup points standard
—other points special
Milled Studs
Standard or
special threads
Complete range of sizes from ¼" dia. Also larger than usually listed—Hex Heads to 2½" dia.; Flat Heads to 1" dia.; Set Screws to 1½" dia., in required lengths.
Write for catalog.
CLEVELAND Top Quality FASTENERS
THE CLEVELAND CAP SCREW COMPANY
2935 East 79th Street, Cleveland 4, Ohio
Warehouses: Chicago • Philadelphia • New York • Providence
originators of the Kaufman DOUBLE EXTRUSION Process

er has been completely purged. Copies are available for 50 cents from the society, 33 W. 39th St., New York 18.

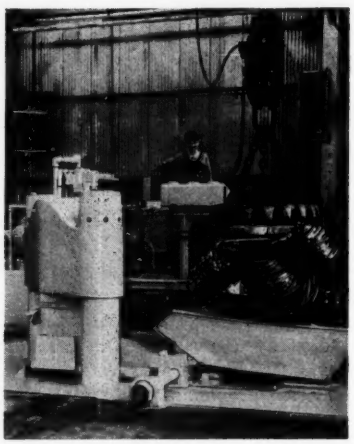
System Tests Air Consumption

System for measuring air consumption of single-cylinder test engines to 1 per cent accuracy under all operating conditions was described at the recent annual meeting of the Society of Automotive Engineers. Reporting the development, engineers from General Motors Research Laboratories say its principal advantage occurs in eliminating measurement errors that result from pulsating air flow when valve intake opens and the piston moves.

Technique employs the principle of critical or sonic flow of gas through a convergent nozzle. An added benefit is maintenance of constant inlet air pressure, temperature and humidity independent of prevailing atmospheric conditions. The speakers hold that systems which use conventional orifice meters can result in measuring errors reaching as high as 20 per cent. They add that these meters also fail to isolate the engine's breathing from varying atmospheric conditions. The GM system is unnecessary for multicylinder engines because they produce a steady state of air flow.

Scrap Density: 45-70 per cent

Automatic steel scrap baler, reported to produce bales more uniform in size and weight and achieve densities of 45-70 per cent, operates at Wheeling Steel Corp.'s Beech Bottom, W. Va., plant. Company officials say most machines bundle scrap to a 14-30 per cent



LOOSE SCRAP DROPS TO HOPPER
. . . blocks appear in three minutes

density, adding that easier handling and more efficient use of open hearth charging boxes result from the increase made possible by their baler.

In the Beech Bottom operation, a baler box 90 inches long, 48 inches wide and 30 inches deep is used. Loose scrap is fed into the box, crushed, then squeezed into about an 18 sq in. block weighing 600-1000 pounds. Three hydraulic rams develop 225, 400 and 750 tons of pressure respectively; a fourth exerts 50 pounds. The latter opens and closes the baler box and pushes out the bales. Entire operation, from loose scrap to compressed block, takes less than three minutes.

Hydraulic Press Co., Mt. Gilead, O., worked more than a year with

GLOBE

SUPERIOR LADLE BRICK

Here is a plain statement without any frills: you can increase your melting capacity if you use GLOBE SUPERIOR LADLE BRICK. This statement has to be proved, of course, before it can be accepted at face value. Well, it's proved every day in steel plants all over the country. Here's how it works: the labor and materials used for refractory replacement are a terrific drag on production time. The excellent quality of GLOBE SUPERIOR LADLE BRICK, wire cut or dry pressed, makes it last longer. By lasting longer, it salvages much of the time lost in refractory replacement. The result, of course, is increased melting capacity. Let us help you select the right type of GLOBE SUPERIOR LADLE BRICK for your particular needs. You'll find it quite profitable.

SERVING THE STEEL INDUSTRY SINCE 1873

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

PHOENIX SPECIAL RAIL FINISHING ROLLS are color marked for a specific use in rolling . . .

RAILS—FINISHING ROLLS

P.R.W.

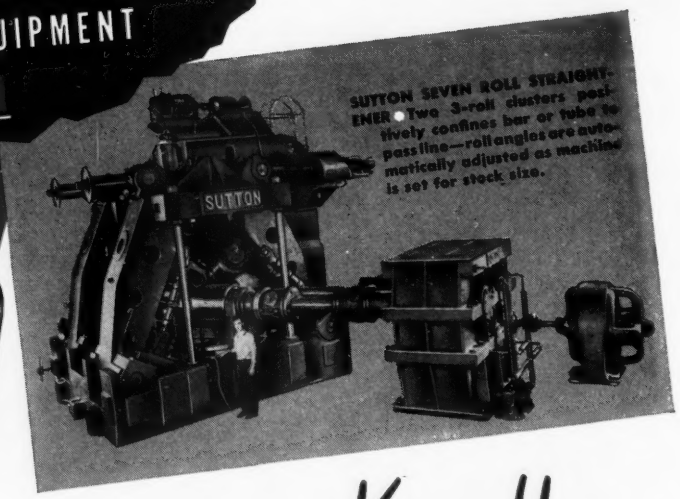
PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of BLAW-KNOX COMPANY • PITTSBURGH, PA.

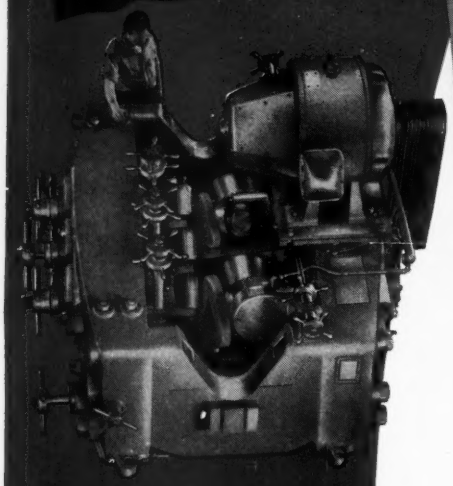
OTHER PITTSBURGH ROLL TYPES

CHILL	PHOENIX "K"
MOLY CHILL	PHOENIXLOY
PGH. GRADE 25	PHOENIX METAL
PGH. GRADE 35	PHOENIX METAL MASTER
PGH. GRADE 45	PHOENIX "A"
PGH. GRADE 55	CARBON STEEL
PGH. GRADE SPECIAL PROCESS	

STRAIGHTENING EQUIPMENT by—SUTTON



SUTTON SEVEN ROLL STRAIGHTENER • Two 3-roll clusters positively confines bar or tube to pass line—roll angles are automatically adjusted as machine is set for stock size.

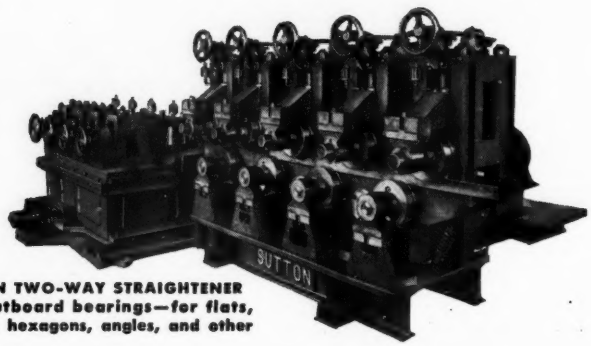


SUTTON FIVE ROLL STRAIGHTENER • With direct gear drive—especially adapted to high speed straightening of bars and tubes.

SUTTON FIVE ROLL STRAIGHTENER • With universal coupling type drive for extra heavy-duty performance.

..... it's the *Know How* that counts

Sutton has specialized in straightening equipment for 35 years! Sutton Straightening Machines are built in all sizes for bars and tubes from ⅛" to 18" in diameter and operate at speeds up to 1000 feet per minute. Pictured are representative examples.



SUTTON TWO-WAY STRAIGHTENER • With outboard bearings—for flats, squares, hexagons, angles, and other shapes.

Write for a proposal or for specific information in answer to any straightening problem you may have. There is no obligation for this service.

SUTTON *Engineering* COMPANY

Manufacturers for Ferrous and Non-Ferrous Industries

STRAIGHTENERS, SHEET LEVELLERS, HYDRAULIC STRETCHERS, GAG PRESSES, ROTARY CLEANERS, HEAVY DUTY UNIVERSAL JOINTS, ROLLS

BELLEFONTE, PENNSYLVANIA

Wheeling engineers to build the equipment. Box top is flush with the floor and baling is done immediately below. A pit 16 feet deep houses hydraulic cylinders, pressure rams and understructure.

Device Logs Power Plant Data

About 400 different conditions in an electric power plant can be automatically reported, recorded and printed by a device described at the Instrument Society of America's power plant instrumentation conference. Report on the new instrument was made in a joint paper by Stanley A. Kroll, Joseph S. Wapner and Jack G. Roback, Taller & Cooper Inc., Brooklyn.

They emphasize that the precision device is easily applicable in industrial plants, such as steel mills, where production and quality control are essential. Mr. Kroll, company vice president and chief electrical engineer, says the instrument stores up to 26 different reports summarizing when and where conditions occur and when they are restored to normal. It shows normal conditions, as well as deviations, in transformers, boilers, turbines, circuit breakers and other auxiliary equipment. He adds that the company's first recorder-annunciator unit is being installed in the Johnsonville, Tenn., plant of the Tennessee Valley Authority.

Handbook Details Flexible Shafts

Third edition of the "Flexible Shaft Handbook" is available from S. S. White Industrial Division, New York. Manual provides a comprehensive picture of the range and scope flexible shafts have in transmitting power and remote control, and details their construction, selection and application. Current edition covers changes and developments made in the field since 1944.

Handbook is arranged conveniently into five basic sections. The first and second illustrate and describe construction and functions of power drive and remote control flexible shafts and discuss the steps necessary for selection of specific applications. Third section considers the subject of flexible casings used with flexible shafts. An important addition here

Tomorrow's Buildings To Demand More Attention To Door Efficiency

Like the WHEEL . . .

KINNEAR Rolling Doors are HERE TO STAY!

Like the rolling action of the wheel, the smooth upward operation of Kinnear Rolling Doors involves basic, unchanging principles of engineering efficiency. The door's advantages have been proved in thousands of installations, through more than half a century.

Today the dollar-saving importance of these Kinnear advantages is getting closer attention from building designers everywhere. As building *construction, operation* and *maintenance* costs continue to rise, the space, time, labor *and construction costs* that can be saved with efficient doors are major items in any business operation.

Kinnear's rugged curtain of interlocking metal slats opens straight upward. It coils compactly out of the way above the opening. Floor, wall and even ceiling space remain fully usable at all times. The door clears the opening from jamb to jamb, and from floor to lintel, completely out of traffic's way. When open, it is safe from damage by wind or vehicles. When closed, it presents an all-metal barrier that assures extra protection against storms, intruders, and fire.

In addition, Kinnear Rolling Doors provide smooth, easy operation under all conditions. They may be controlled manually, mechanically (by chain or crank) or electrically. Motor operated doors can be equipped with any number of remote control switches, for highest convenience. Kinnear Rolling Doors are built of various metals, in any size, for easy installation in old or new buildings. Let us send you complete information.

The KINNEAR Manufacturing Co.
Factories:
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

SAVING WAYS in DOORWAYS
KINNEAR ROLLING DOORS

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Joining Copper-Base Alloys

Soldering, brazing and welding are three common methods of joining copper and its alloys both on the production line and in the maintenance shop.

In the three methods there are four prerequisites in obtaining the strongest bond possible:

1. Clean surfaces, both mechanical and chemical.
2. A good flux.
3. Close contact between the parts to be joined.
4. Correct temperature.

Cleaning

All oil, grease and other foreign matter, and oxides if present, should be removed. Visual inspection cannot be used to detect this oxide. Either a file or grinding will remove the oxide to get to the base metal. On production basis usually a bright dip is used. In some plants this is done as parts are needed on the assembly line to prevent oxidation prior to use.

Although there are acid-base fluxes which may be used to remove the oxides more readily, they are not normally accepted in production work as all of the flux must be removed promptly after soldering or brazing to prevent future corrosion of the metal.

Fluxes

With the exception of the acid-base fluxes mentioned above, the main purpose of a flux is to cover the parts with a film which will exclude air during the soldering or brazing operation since oxidation is speeded up when heat is applied. The fluxes should melt well below the melting point of the solder to protect the surface while being heated to soldering or brazing temperature.

Resin or borax are generally selected since they are considered non-corrosive and it is not necessary to remove them after joining. Sal-ammoniac and zinc chloride are also used but they must be removed after the joining is completed to prevent corrosive attack. In brazing, calcined borax and boric acid in powdered form are quite commonly used.

There are many proprietary fluxes on the market which are available for soldering and brazing and in many cases are superior.

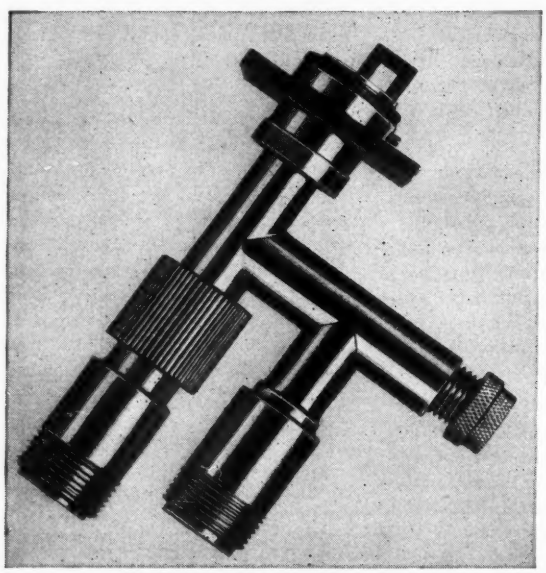


Illustration shows crystal mixer made from copper base alloy components are silver soldered together

Hold Work Closely

As solder and brazing metal flows through capillary action, it is important that the parts being joined be held closely together. Too large a space between the parts will prevent the molten bonding material from flowing and sealing tightly over the entire area. A good example of this is where corners of rectangular boxes are being soldered or brazed. It is often necessary to use a tight jig or clamp to insure intimate contact between the parts.

Correct Temperature

The parts being joined should be heated slightly above the melting point of the solder or brazing material. When using a soldering iron, care should be taken to insure that the copper tip of the iron is heavy enough to maintain sufficient heat to carry out the operation. When using a flame in soldering, care should be taken not to overheat the metal as oxides would form too rapidly and the flux would be burned off and the metal softened to too great a degree.

In brazing or "hard soldering" a gas-air or gas-oxygen flame is normally used, although with care oxyacetylene torches can be employed since higher temperatures are needed than in soldering. Red heat is needed for this type of joining. Again, too high a heat on the part will burn off the flux and cause the metal to oxidize thereby weakening the bond. The flame used should be a reducing one (excess of fuel in the fuel-to-air ratio) or a neutral one.

In furnace brazing a reducing atmosphere is also helpful to prevent oxidation and to remove any oxide which might be left on the metal.

(7852)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)

In the February and March 1951 issues of this column, it was shown that dezincification occurs in a number of patterns such as plug, layer, intercrystalline, and Beta phase types. In addition to these, relatively large crystals of copper in the corroded areas may develop in contact with (1) very corrosive waters, (2) soldering flux residues which have not been promptly washed from the brass surface, (3) moist or wet organic and inorganic compounds containing chlorine.

Effect of Corrosive Water

A representative instance of this type is shown in the following photomicrograph. It should be noted that the

Micrograph of cross-section of dezincified non-inhibited Admiralty tubing. Mag. 50X. Note the original fine grained structure of the metal at the upper right hand corner. The large island-like crystals of copper, formed from contact with water having a negative calcium carbonate index, are columnar in structure surrounded by large voids.

grains of copper are considerably larger than the grains in the unattacked brass which still remained—see upper right hand corner of the photomicrograph. This type of dezincification rarely occurs in those brasses containing more than 85% copper or in the yellow brasses containing arsenic or other dezincification inhibitors.

Effect of Soldering Fluxes

The soldering fluxes which may lead to the formation of relatively large crystals of copper generally contain zinc chloride. Where such fluxes are used for the soldering of brasses, the adverse effect can be prevented by copious washing of the surface immediately after the soldering operation.

Effect of Dilute HCl

The presence of traces of water, particularly in liquid organic compounds containing chlorine, greatly increases the corrosiveness of the compound through the formation of a dilute hydrochloric acid solution. Such corrosion can be prevented by keeping the organic compound in an anhydrous condition. Copper and the high-copper alloys are also more resistant to corrosive attack by moist or wet chlorinated organic compounds. Corrosion may also be hindered by the use of certain inhibitors, although details regarding their nature are incomplete at the present time.

YOUR BRASS SCRAP IS NEEDED

Here are a few suggestions which, if followed by metal goods manufacturers, would help the scrap situation considerably.

1. Store all scrap in clean containers, keeping it separated by alloy and properly identified.
2. When a sufficient quantity has been collected, notify the brass mill for whom it is intended. Give details as to weight, alloy, character of scrap. Ask the brass mill to collect it either in their own trucks or to designate the scrap dealer who does this work for the brass mill.
3. If you know where there are clippings of zinc resulting from manufacturers' cups or stampings, or scrap copper wire or other forms of good clean scrap of brass, bronze or copper not generated by brass goods manufacturers, please notify your brass mill products supplier.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Weight Slide Rule is designed to determine the amount of copper, brass, lead, steel, cast iron, aluminum or magnesium stock needed to produce a piece of given size and shape. A special arrangement of standard slide rule scales on the reverse side permits direct reading of squares, cubes, square roots and cube roots. **No. 1209**

Cam Operated Drill Jig positions small parts under drill plate in short and medium production runs. The jig mounts a bushing plate that is adjustable for vertical work height and acts as the means to clamp work as well as guide the drill. The plate is pulled down upon the work by cam and lever action. Base and back are finished so that work can be positioned either vertically or horizontally. **No. 1210**

Pistol-Type Bore Gage is designed for use in limited space. The handle can be adjusted to the proper checking depth and the indicator positioned to face the operator at all times. Any type or size of indicator can be adapted to the gage, which is available in five models with ranges from 1-1⅛ in. to 6-12 in. Depth varies from 1-33/64 in. to 3-13/32 in. **No. 1211**

Synthetic Lacquer Coating provides resistance to tarnishing caused by body acids, perspiration, alkalis and corrosive elements in the atmosphere. The water-white lacquer may be applied to copper, brass, bronze, aluminum, platinum and other non-ferrous metals. Applied by brush, dip or spray methods, the lacquer dries dust-free within a few minutes and can be handled in about ten minutes. It is available in gloss, semi-gloss and flat finishes. **No. 1212**

Bench Type Pneumatic Press is available in four sizes with capacities ranging from 1400 to 6000 pounds. The power head is a diaphragm unit with spring return. The piston does not touch the cylinder wall, but is joined to it with a long-stroke diaphragm that eliminates friction and seals in the pressure. A spring beneath the piston returns it to the top of its stroke when pressure is released. Work surface on the four models measure 8 to 10 in. from front to back and 7 to 9 in. from left to right. Throat dimension is 7 or 8 in. Control centers either at a hand-operated valve or one with solenoid actuation. **No. 1213**

Electric Melting Tank handles compounds and waxes employed to coat finished metal products for protection in storage and shipment. The unit consists of an inner melt tank, an outer tank and an air jacket that forms a passage which conducts heat from the bottom of the outer tank up around the sides of the inner tank. Normal operating temperature of the unit is around 180° F. Five sizes are available, with the following dimensions: length, 30 to 48 in.; width, 18 to 30 in.; depth, 14 to 30 in., and height, 36 to 42 in. **No. 1214**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
"Bridgeport" BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities
Advertisement

is inclusion of a plastic covered casing line used where oil and abrasion resistance are important.

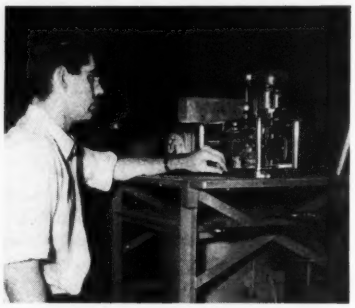
Fourth section provides information on various types of angle adapters and fittings, suggesting the most advantageous way to use these parts on this type application. Appendix of engineering tables and data concludes the work. Copies are offered free to designers, engineers and purchasing agents who write to the division on company letterhead, at 10 E. 40th St., New York 16.

Test Predicts Ore Reaction

Success of a time-saving laboratory test that predicts how iron oxide ore from a newly-opened deposit will react in a pig-iron blast furnace is reported by the U. S. Bureau of Mines.

Known as the loss-in-weight method, the test is conducted in an electrically-heated retort, suspended from a sensitive balance or scale used to determine the amount of oxygen removed from an iron oxide charge. Bureau of Mines considers it an improvement because of rapid direct weighing, done while the charge is in the retort. Test can be completed within a few hours.

During the test, ore is crushed to the desired size and heated in the retort, using hydrogen as a reducing gas. Rate at which oxygen is removed from the ore is disclosed by weighing the charge periodically. Oxygen combines with hydrogen to give water, which is vaporized.



A TEST IN TIME
. . . saves coke in new ore work

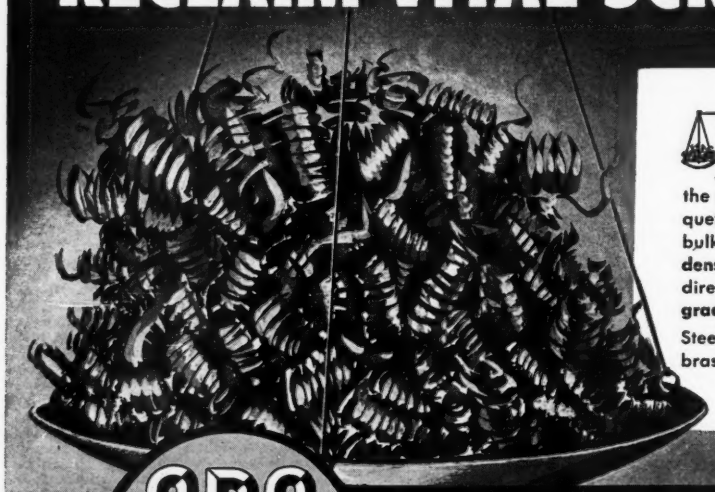
Bureau of Mines metallurgists in Minneapolis began work on the loss-in-weight method in 1946. Recent improvements in design have resulted in its present perfection. Ore samples are tested in the Mines Experiment Bldg., University of Minnesota—the only federal laboratory so equipped. The bureau says many operators report sizable coke savings through rapid, accurate analysis of samples forwarded to its laboratory.

Most tests have concerned agglomerates made from Minnesota taconite and other magnetic concentrates. Iron oxide pellets made of magnetic taconite concentrate are the newest blast furnace materials to be tested.

Metal Stitching Pays Off

Metal stitching cuts assembly time of anti-squeak felt to steel strap in the production of Jeep gas-tank straps by two-thirds and saves 5 cents per unit at Willys-Overland plant, Toledo, O. Fastening the felt lining to the steel strap with metal stitches instead of rivets, the company boosted its pro-

RECLAIM VITAL SCRAP *with a*



Conserve critical metals . . . **increase** self-sufficiency . . . **eliminate** scrap handling and storage problems with the press that **pays for itself.** The MILWAUKEE Briquetting Press **automatically** converts low-grade bulk borings, turnings, chips and shavings into dense **cylindrical briquettes** which can be charged directly into furnace or foundry cupolas as **high-grade scrap.**

Steel, aluminum, cast iron, bronze, magnesium, brass and other metals can be briquetted by a MIL-

SPO MILWAUKEE

CASTINGS ARE PERMANENT

384-81

6495 Grand Division Avenue

duction of straps to 300 units per hour. These tank strap assemblies support and cushion fuel tanks on military and civilian Jeeps.

Five metal stitches anchor the 1/16x1-inch strip of asphalt-saturated felt to the 18-gage steel strap. The stitches are formed by Acme-Morrison metal stitchers from 18-gage tinned or galvanized wire having a tensile strength of 290,000 to 320,000 psi.

High-strength wire is automatically fed from a coil, cut to length, formed into a stitch, driven through strap and lining, and clinched in 1/5 second. This rapid process cuts production time and costs by eliminating drilling and alignment operations necessary with riveting.

Chart Tells Bolt Sizes

Thread pitch diameter tolerance chart from Security Locknut Corp., Melrose Park, Ill., eases engineers job of finding dimensions of a bolt and nut to include on drawings. The chart, in a size range from 3/8 to 2¾ inches in both coarse and fine threads, includes external and internal threads in classes 2, 3, 2A, 2B, 3A, and 3B.

By revolving chart to proper bolt size, dimensions and tolerances for both nut and bolt can be read. Arrangement permits immediate comparison between maximum bolt and minimum nut dimensions. Interference is thus avoided. Charts will be mailed by Security Locknut to engineers and designers requesting them on company letterhead.

Manual Details Mine Welding

First in a new series of welding manuals, titled "Coal Mine Maintenance Welding," is offered by Eutectic Welding Alloys Corp., New York. The illustrated book details specialized welding applications used in mine maintenance. These include such problem cases as heavy cast iron repairs, work on dragline shovel pinions and pump and compressor repair, with case histories based on actual operations.

Two pages of tabular material comprise a standardization chart that covers more than 50 typical maintenance problems and recommends welding alloys and data for their repair. Copies can be obtained on request to the company's Dept. P, 172nd St. & Northern Blvd., Flushing, New York 58.

Rotary Stacker Adds Capacity

Storage system installed by American Cyanamid Co. at its Brewster, Fla., plant, makes use of a rotary stacker and conveyor and underground tunnels for storage and blending. Added storage capacity and blending accuracy, plus more efficient operation of facilities are the result, say company officials.

Rock from the company's two nearby phosphate mines arrives at Brewster in hopper-bottom cars that empty directly into a track hopper. From there, rock feeds at 600-800 tons an hour onto a 36-inch wide belt, is conveyed up the 80-foot stacker, then dropped on the appropriate part of the pile within a wide semicircle. Rotation or pivot is controlled from the track hopper building.

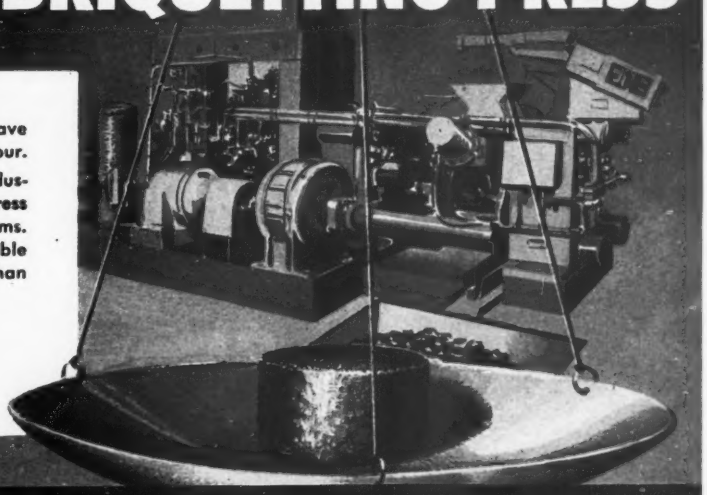
Directly under the different rock grades in the storage pile are even-

MILWAUKEE BRIQUETTING PRESS

WAUKEE press. Six models are available which have capacities ranging from ¾ to 3½ tons per hour.

Leading manufacturers in the metal working industry are utilizing the **MILWAUKEE Briquetting Press** to solve their vital material and scrap problems. Savings effected by the MILWAUKEE Press enable most users to **write off the entire cost** in less than one year.

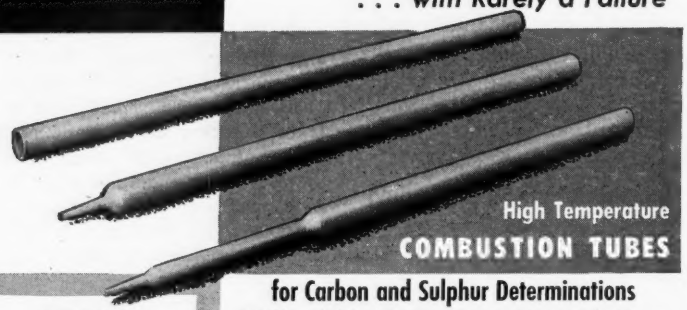
Write today for 8-page illustrated Bulletin No. 117 for complete data and specifications.



Foundry Equipment Division

Cleveland 25, Ohio

MORE Determinations per Tube
. . . with Rarely a Failure



High Temperature
COMBUSTION TUBES
for Carbon and Sulphur Determinations

SPECIALTIES
Immediately available are standard porcelain specialties such as retorts, flasks, crucibles, etc. Taking a little longer — but not much — are McDanel Porcelain parts especially developed and designed to meet your specific needs.

McDanel High Temperature Porcelain Combustion Tubes and Zirco Tubes keep laboratory control costs at rock bottom. They are non-spalling, non-blistering and gas-tight. McDanel Tubes are precision made in every detail and their specially-developed refractory body gives them top resistance to thermal shock. Always specify McDanel Tubes from your supplier or Dealer.

Write Today for Catalog *"McDanel Industrial Porcelains"*

McDANEL REFRACTORY PORCELAIN CO.
BEAVER FALLS, PENNA.

OTTAWA OSP INC. STEEL PRODUCTS

For
25 YEARS
A dependable supplier of
HARDENED and GROUND
SCREW MACHINE PRODUCTS

OTTAWA STEEL PRODUCTS, INC.
GRAND HAVEN, MICH.

NUCLEAR INSPECTOR: Ampoule of radioactive cobalt wire examines castings successfully for internal defects. Gamma rays penetrate thicknesses to 6 inches and picture defects when used with photographic film. This relatively low-cost isotope is applied by Empire Steel Products Inc., Reading, Pa.

ly-spaced openings into an underground concrete tunnel. Gates, controlled electrically, proportion the required grades and deposit them on conveyor belts.

Aussies Get Bimetallic License

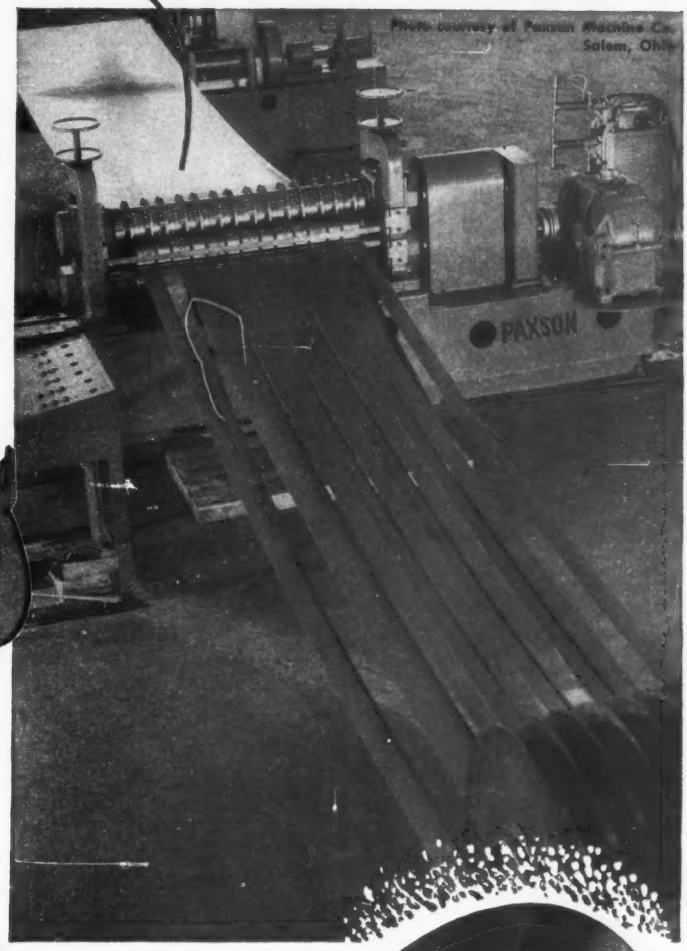
Bimetallic pistons for automotive engines will be produced in Australia by Rolloy Piston Co. Ltd., Port Melbourne. The Australian firm has a license agreement with Al-Fin Division, Fairchild Engine & Airplane Corp. to use its process for molecularly bonding aluminum to steel or iron. Under the license, Rolloy will also make bimetallic brake drums, sleeve bearings and bushings, timing gears and cylinder barrels.

Threads Meeting Announced

Screw Threads Committee of the International Organization for Standardization will meet June 11-14 at Columbia University, New York. Meeting will be in conjunction with the triennial meeting of the ISO, June 9-21. Twenty-one nations, including the U. S. actively participate in the international program of thread unification.

Canada, the United Kingdom, and the U. S. have reached agreement on a system of unified screw

it's OK let 'er go!



the gang's all here

. . . ready to knock down production costs—because OK Gang Slitter Knives run hour after hour without re-grinding giving you top machine productivity at all times. Here's why: exact metallurgical specifications for our steel—an exclusive heat treating process to give uniform hardness and temper —special grinding and finishing to tolerances of ± .00025 or finer.

Producers for the Metal Working Industry of:

SLITTER KNIVES • SHEAR BLADES • ROTARY SHEAR KNIVES
HARDENED SPACERS • HARDENED WAYS, GIBS, RACES

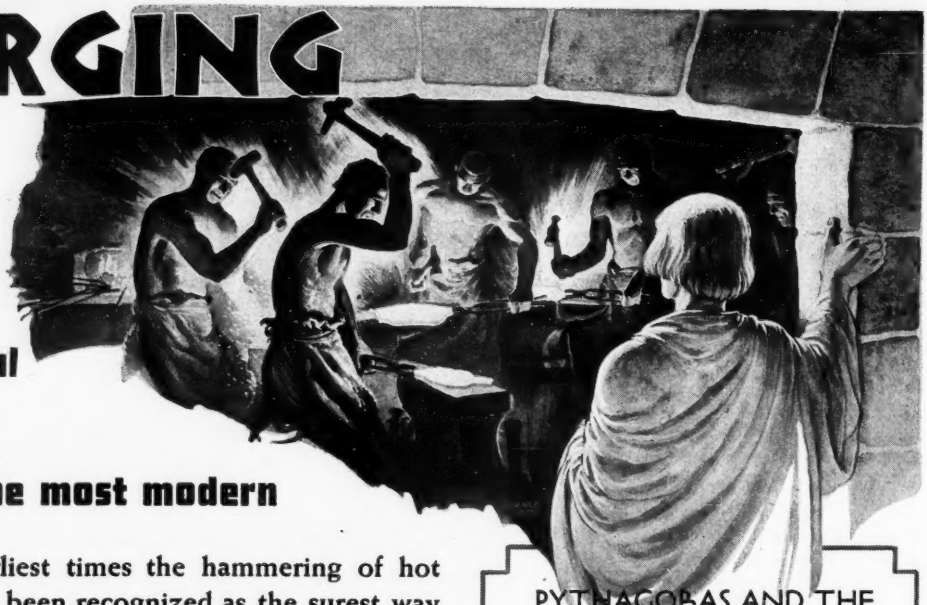
GO WITH OHIO GREEN

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

FORGING

most ancient of the mechanical arts . . and the most modern



SINCE earliest times the hammering of hot metal has been recognized as the surest way of increasing the inherent strength of the metal and giving it added toughness.

Today, with speeds, pressures, stresses and strains to almost unbelievable limits, the importance of greater strength and toughness in metal parts is magnified immensely.

Chambersburg Hammers are at work in thousands of plants, imparting that added strength and toughness to the metal parts that make up our defense mechanisms as well as to the metal parts that make up such a large part of our peace-time economy.

PYTHAGORAS AND THE FIVE HAMMERS

IT is related that Pythagoras, greatest of the Greek scientists, who was born about 570 B.C., was working on his theory of the musical scale when he passed a blacksmith shop. The musical chime of the hammers gripped his attention. He went in the shop and found five smiths working. "Might he weigh their hammers?" He did so, finding four of them in the proportions of 12, 9, 8 and 6. (The fifth, which had been spoiling the harmony of the chime, bore no musical relation to the rest.) From this, the great Ionian scientist worked out his theory of the fixed notes in the musical scale.

The modern forging hammer is no musical instrument and the chime of hammer and anvil is still confined to the blacksmith shop, but the strengthening effect of hammering on metal is as true today as in Pythagoras' time.

CHAMBERSBURG ENGINEERING COMPANY
Chambersburg Pennsylvania

CHAMBERSBURG

THE HAMMER BUILDERS

threads in inch dimensions. Countries now using the metric system have made progress toward international agreement on a system of threads in metric dimensions.

Most industrial countries on the Continent have adopted national standards for metric threads and for Whitworth threads, the latter being interchangeable with the British Standard Whitworth Threads. If these countries now follow the British in changing to the unified screw threads an international system of screw threads in inch dimensions would be established.

ASTM Specifies Nodular Iron

New and revised standard specifications important to metalworking are reported by the administrative committee on standards, American Society for Testing Materials. The first, covering nodular iron castings (A339-51T), satisfies a demand for an acceptable purchase standard for ductile iron. This is defined as cast iron with the graphite substantially in spheroidal shape and substantially free from flake graphite.

Since commercial knowledge is not developed fully, the committee emphasizes the provisional nature of its work. They add, this is the first approach to covering the product by standardization.

On magnesium-base alloy products, revisions are reported that cover sand castings (B 80-49 T) and sheet (B 90-49 T). These bring temper designations into agreement with current commercial practice. Approved changes in specifications for permanent-mold castings (B 199-49 T) add the temper T6 for alloy AM100A.

Tips Brazed Without Strain

Method for brazing carbide tips to dial indicator points is announced by Eastern Tool Co., E. Hartford, Conn. Company says the result is a firm bond between tip and body without a build-up of brazing strain in the carbide, eliminating possibility of tip fracture.

Hardest possible grade of carbide is used. Evaluation indicates long life and high resistance to wear when in contact with revolving, cylindrical pieces. Hard carbide also produces a high resistance to sudden shock.

ROTO FINISH

CUTS DEBURRING COSTS
50% to 90% on individual parts
at the WHIRLPOOL CORPORATION, St. Joseph, Michigan

...saves...

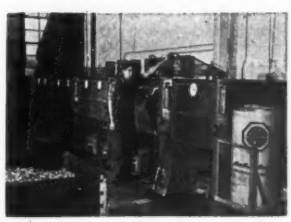
$0.395 per hundred on BRASS RETAINING RINGS — AFTER / BEFORE

$0.23 per hundred on CRANK ASSEMBLY PARTS — AFTER / BEFORE

$1.60 per hundred on CAM BARS — BEFORE / AFTER

helps 6 people do the work of 16

The Whirlpool Corporation found a real solution to manpower scarcities and rising prices when they installed Roto-Finish Deburring Machines. By this mechanical method, 6 people now deburr an even greater quantity of parts than 16 could do before. Thus a much needed source of manpower was found for use in other operations.



The cost of deburring individual parts has been reduced 50% to 90% as shown above. And in addition, parts can now be deburred economically that were impossible to do by hand methods because the cost was prohibitive. Roto-Finishing these parts in some cases has eliminated special handling in subsequent operations. As a result, production has been speeded and manhours have been saved in stamping, grinding and other finishing operations.

Let us show you how you can make similar savings in time, manhours and money. Send sample parts to the Roto-Finish laboratory for a free demonstration. *Write for Complete New Catalog.*

Roto-Finish COMPANY
associated with The Sturgis Products Co.
3712 MILHAM ROAD, KALAMAZOO, MICH.
P.O. Box 988 — Phone 3-5378

FOREIGN REPRESENTATIVES: CANADA — Windsor — Roto-Finish Canada Limited • ENGLAND — London — Roto-Finish Limited — 39 Park Street — Mayfair • AUSTRALIA — Melbourne — A. Flavell Pty, Ltd. • HOLLAND — Delft — N. V. Roto-Finish Maatschappij — Potterdamse — WEG 370A • AUSTRIA, GERMANY, SWITZERLAND — Frankfurt a.M. — Metallgesellschaft A.G., Germany • ITALY — Milan — Societa Roto-Finish a R.L. — Sesto S. Giovanni — Viale E. Marelli 31 • FRANCE — Paris — Societe Roto-Finish, 70 rue de la Republique-Puteaux (Seine) • BRAZIL — Rio de Janeiro — Commercial E. Industrial de Formos Werco, Ltds.

ORIGINATORS OF THE ROTO-FINISH PROCESSES

the double-duty micrometer!

You're in for a real surprise the first time you use a Federal MIKEMASTER! You'll be amazed at the honest-to-goodness convenience and downright accuracy of this *indicating micrometer.* You'll like its double-usefulness, too—the way you can use it as an *indicating snap gage* for measuring duplicate parts.

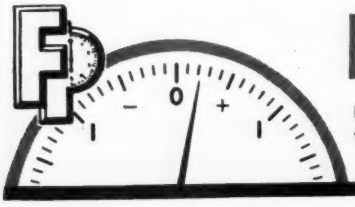
Here are the *big* features that make this tool far superior to regular old-style "mikes":

- **BUILT-IN DIAL INDICATOR** with clear graduations and easy-to-set Tolerance Hands for quick size checking down to a .0001".
- **CONSTANT ANVIL PRESSURE** that eliminates errors of "feel" . . . insures the same high accuracy no matter who is measuring with the Mikemaster.
- **RETRACTABLE LOWER ANVIL** for easy (non-scratching) insertion of workpieces when checking duplicate parts or inspecting for taper and roundness.

You have to handle the Mikemaster yourself to fully appreciate what it can do for you. *Write for a free demonstration.* FEDERAL PRODUCTS CORPORATION, 1212 Eddy Street, Providence 1, R. I.

Actual test proves the MIKEMASTER eliminates errors of "feel":

Four people, using a high grade conventional micrometer, measured the same diameter on the same piece three times. All measurements differed from .0002" to .0008". Only one measurement was correct. With the Mikemaster in a similar test, *all measurements but one* were exactly "on the nose" and this one showed less than .0001" variation.



FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES.

CALENDAR
OF MEETINGS

February 25-28, Industrial Ventilation Conference: School of Engineering, Michigan State College, E. Lansing, Mich. Secretary: K. E. Robinson, Division of Industrial Health, Michigan Dept. of Health, Lansing 4, Mich.

February 28, Bituminous Coal Research Inc.: Annual meeting and exhibit, Edgewater Beach Hotel, Chicago. Address: 804 Southern Bldg., Washington 5. Secretary: C. A. Reed.

March 3-7, American Society for Testing Materials: Spring meeting & committee week, Hotel Statler, Cleveland. Society address: 1916 Race St., Philadelphia. Secretary: C. L. Warwick.

March 4-6, Society of Automotive Engineers: National passenger car, body and materials meeting, Hotel Book Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 5, Manufacturers Standardization Society of the Valve & Fittings Industry: Annual meeting, Hotel Commodore, New York. Society address: 420 Lexington Ave., New York 17. Secretary: Lester W. Benoit.

March 5, Steel Kitchen Cabinet Manufacturers Association Inc.: Quarterly meeting, Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

March 10-14, National Electrical Manufacturers Association: Spring meeting, Edgewater Beach Hotel, Chicago. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

March 10-14, National Association of Corrosion Engineers: Annual conference and exhibit, Hotels Buccaneer and Galvez and Galveston Municipal Pier, Galveston, Tex. Association address: 919 Milam Bldg., Houston 2. Secretary: A. B. Campbell.

March 11-14, Society of the Plastics Industry Inc.: National Plastics Exposition, Convention Hall, Philadelphia. Society address: 67 W. 44th St., New York 18. Executive vice president: William T. Cruse.

March 12-14, American Society of Training Directors: Annual conference, French Lick Hotel, French Lick Springs, Ind. Secretary: R. L. Moberly, University of Wisconsin, Madison, Wis.

March 16-19, American Institute of Chemical Engineers: Annual spring conference, Biltmore Hotel, Atlanta. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

March 17-19, Midwest Conference on Fluid Mechanics: Ohio State University, Columbus, O. General conference chairman: Prof. A. N. Tifford, aeronautical engineering department, Ohio State University.

March 17-19, National Association of Waste Material Dealers Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

March 17-21, American Society of Tool Engineers: Annual meeting and biennial industrial exposition, International Amphitheater, Chicago. Society address: 10700 Puritan Ave., Detroit. Secretary: Harry Conrad.

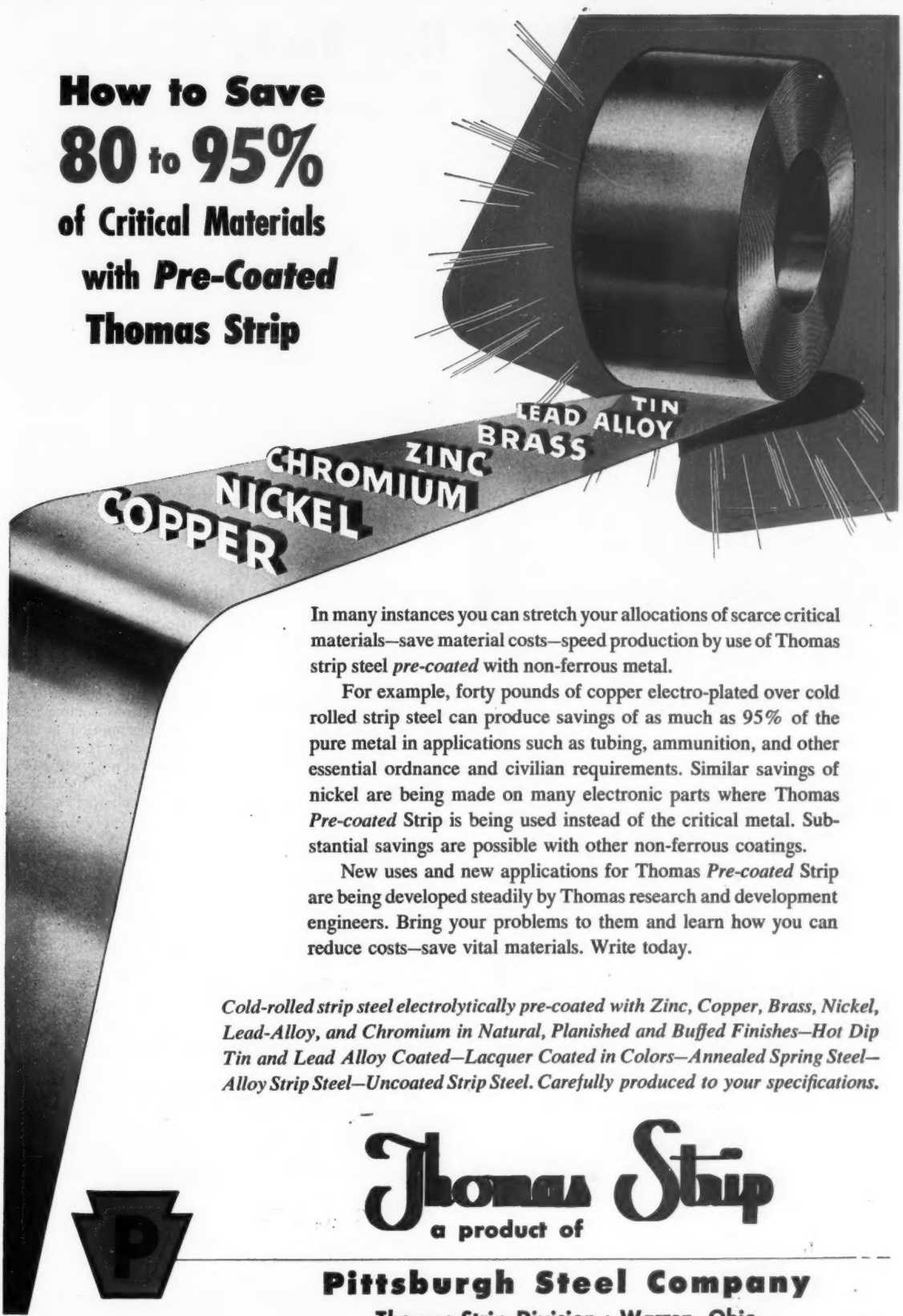
March 18-19, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

March 20-21, Pressed Metal Institute: Spring technical meeting, Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20. Manager: Orrin B. Werntz.

March 21, Materials Handling Institute: Edgewater Beach Hotel, Chicago. Institute address: 731-732 DuPont Circle Bldg., Washington 6. Managing director: R. Kennedy Hanson.

March 22-April 6, Chicago International Trade Fair: Navy Pier, Chicago. Executive director: John N. Gage, Col., U.S.A., Ret. Address: Merchandise Mart, Chicago.

How to Save 80 to 95% of Critical Materials with *Pre-Coated* Thomas Strip



In many instances you can stretch your allocations of scarce critical materials—save material costs—speed production by use of Thomas strip steel *pre-coated* with non-ferrous metal.

For example, forty pounds of copper electro-plated over cold rolled strip steel can produce savings of as much as 95% of the pure metal in applications such as tubing, ammunition, and other essential ordnance and civilian requirements. Similar savings of nickel are being made on many electronic parts where Thomas *Pre-coated* Strip is being used instead of the critical metal. Substantial savings are possible with other non-ferrous coatings.

New uses and new applications for Thomas *Pre-coated* Strip are being developed steadily by Thomas research and development engineers. Bring your problems to them and learn how you can reduce costs—save vital materials. Write today.

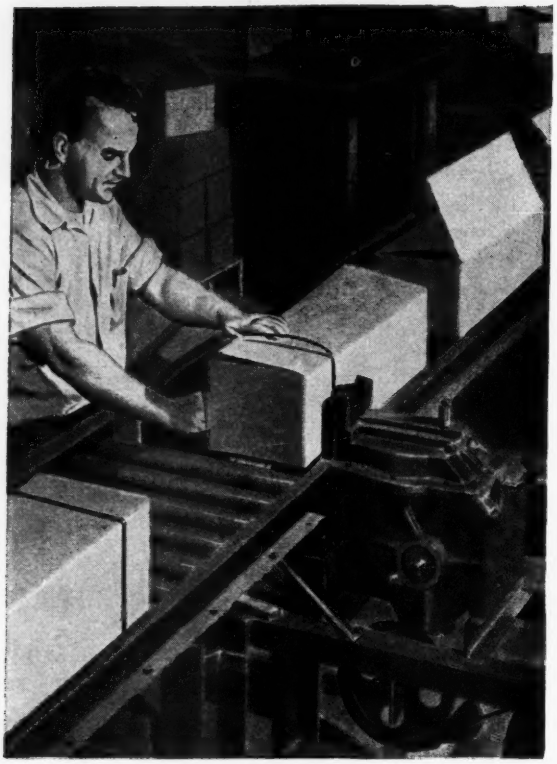
Cold-rolled strip steel electrolytically pre-coated with Zinc, Copper, Brass, Nickel, Lead-Alloy, and Chromium in Natural, Planished and Buffed Finishes—Hot Dip Tin and Lead Alloy Coated—Lacquer Coated in Colors—Annealed Spring Steel—Alloy Strip Steel—Uncoated Strip Steel. Carefully produced to your specifications.

Thomas Strip

a product of

Pittsburgh Steel Company

Thomas Strip Division · Warren, Ohio



Signode equipment boosts output of strapped packages 190 a day!

An eastern manufacturer, using Signode equipment, was turning out 560 packages every day. He was 100% satisfied. But the Signode field man in that territory wasn't. He was sure that he could step up the output of packages and reduce unit packaging costs with Signode's new Power Strapping Machine.

The Signode Power Strapping Machine was put in the production line. The number of packages strapped for shipment jumped from 560 to 750 —190 more per day! Unit cost dropped. Yet, compared to many other Power Strapping Machine installations, this is not a particularly fast operation. In the flooring industry, for example, these machines apply up to 750 straps per hour.

Would you like to talk over your packaging and shipping needs with a Signode field man? No business is too small or too large— no operation too complex. Write

SIGNODE

STEEL STRAPPING COMPANY

2645 N. Western Avenue Chicago 47, Illinois

Offices coast to coast:

In Canada: Canadian Steel Strapping Company Ltd.
Foreign Subsidiaries and Distributors world-wide.

this seal means security in shipping

New Books

Developments in Industrial Furnaces

INDUSTRIAL FURNACES—Volume I, by W. Trinks; cloth, 526 pages, 5½ x 9 inches; published by John Wiley & Sons Inc., New York, N. Y., for $12.50; available from STEEL, Penton Bldg., Cleveland 13, O.

First published in 1923, this book discusses the basic principles underlying all furnace design and operation, provides graphic illustrations and typical examples which reinforce the text and offers conclusions that have been tested and proved in actual furnace practice. This fourth edition brings the book up to date.

Most recent scientific facts research has discovered about heat transfer and furnace design as well as present day design and operating principles and techniques are discussed. Charts of Grober, Gurnie and Laurie have been replaced by those of Hottel and Heisler. All calculations and tables have been changed from gross tons to net tons in accordance with current usage.

Book is divided into sections on capacity, economy, thermal efficiency, strength and durability and movement of gases in furnaces. Arrangement of subject matter remains much the same as the third edition. Infrequently used material has been moved to the appendix. About 40 per cent of the text has been rewritten and 94 new illustrations have been added.

Application of Elasticity Theory

FINITE DEFORMATION OF AN ELASTIC SOLID, by Francis D. Murnaghan; cloth, 140 pages, 5½ x 9 inches; published by John Wiley & Sons Inc., New York, N. Y., for $4.00; available from STEEL, Penton Bldg., Cleveland 13, O.

An essential feature of this book is the consideration of squares and higher powers of the strain components in the theory of elasticity; i.e., the assumption is not made that the deformation is so small that the squares and products of the strain components are negligible. This treatment permits application of the theory to larger deformations and stresses than those allowed by the classical theory.

Matrices are used methodically and an account of those properties of matrices are given in the first chapter. Importance of nonisotropic media is emphasized. The fact that applied stress can make nonisotropic a medium which is isotropic when free from stress is pointed out. Relations between third-order, as well as second order, elastic constants for various types of crystalline media are derived. Final chapter applies theory to problem of deformation of spherical shells and circular tubes under extreme external and internal pressures.

Limits of Nondestructive Testing

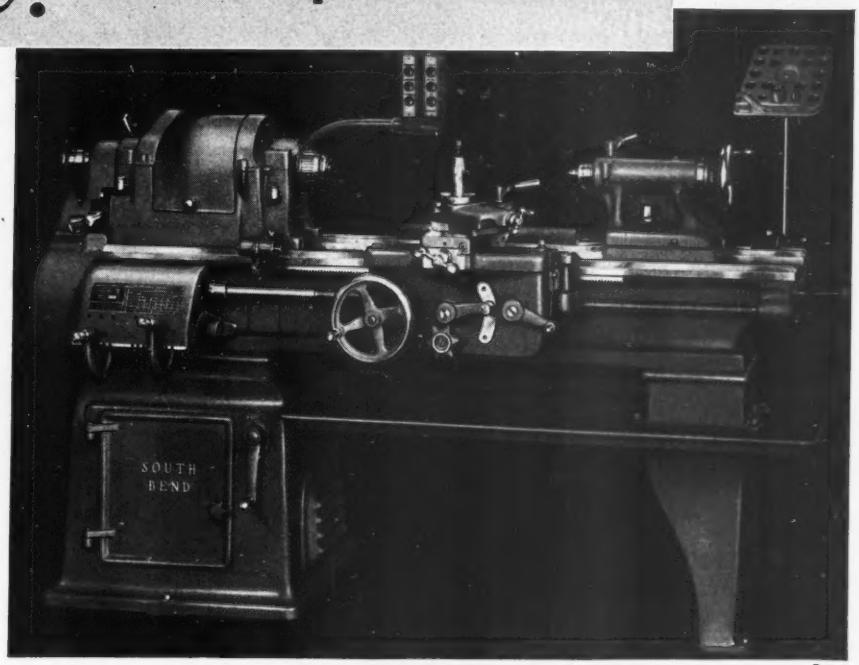
NON-DESTRUCTIVE TESTING OF METALS, by R. F. Hanstock; cloth, 163 pages, 5 x 8½ inches; published by Institute of Metals, London, England, for $3.50.

Main theme of this book is the restatement of certain sections of the sciences having a particular bearing on the nondestructive examination of metals. Nondestructive testing is not narrowly interpreted as the application of radiography, magnetic and ultrasonic methods to the detection of flaws in metals. Although these methods receive consideration, other less well-known methods of examination are described. Purpose of the book is to indicate the limitations within which a test may be expected to operate successfully.

New! SOUTH BEND 16"-12 Speed Lathe

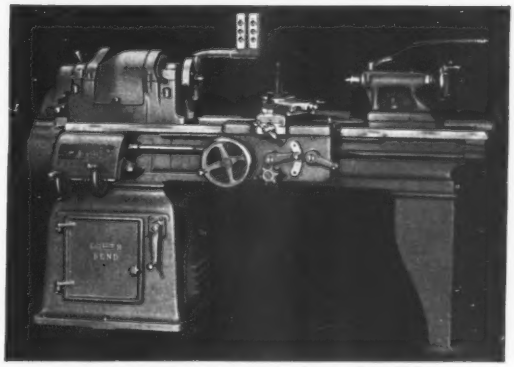
Specifications

Spindle Speeds 12
Direct drive
high range . . . 330, 550, 945
low range . . 150, 278, 475
Back gear drive
high range . . . 32, 70, 118
low range . . . 20, 33, 60
Swing over bed and saddle wings . . . . . 16¼"
Swing over saddle cross slide . . . . . 9⅝"
Center Distances . . . 33½", 45½", 57½", 81½", 105½"
Collet Capacity . . . . . 1"
Spindle Bore . . . . . 1⅜"
Longitudinal Feeds . . . 48 R.H. or L.H., .0015 to .0841"
Cross Feeds . . . 48, .0006 to .0315"
Thread Cutting . . . 48 R. H. or L.H. pitches, 4 to 224 per inch.
Cross Slide travel . . . . 10½"
Compound Rest Top Slide angular hand feed . . . 3¾"



16" x 6'—12 Speed Toolroom Lathe

This new South Bend Twelve Speed Lathe will save time in the production shop, toolroom, maintenance department, or wherever an extra wide range of spindle speeds is needed. Equipped with pushbutton control which provides instantaneous changes between high and low speeds, multiple operations requiring frequent speed changes such as drilling and tapping, boring and reaming, or turning and facing can be performed with utmost efficiency. Send coupon for complete information.



16" x 6'—12 Speed Quick Change Gear Lathe

SEND INFORMATION CHECKED:

☐ _____

_____

☐ 9" and 10" BENCH LATHES

☐ 10" to 16-24" FLOOR LATHES

☐ ½" and 1" Collet TURRET LATHES

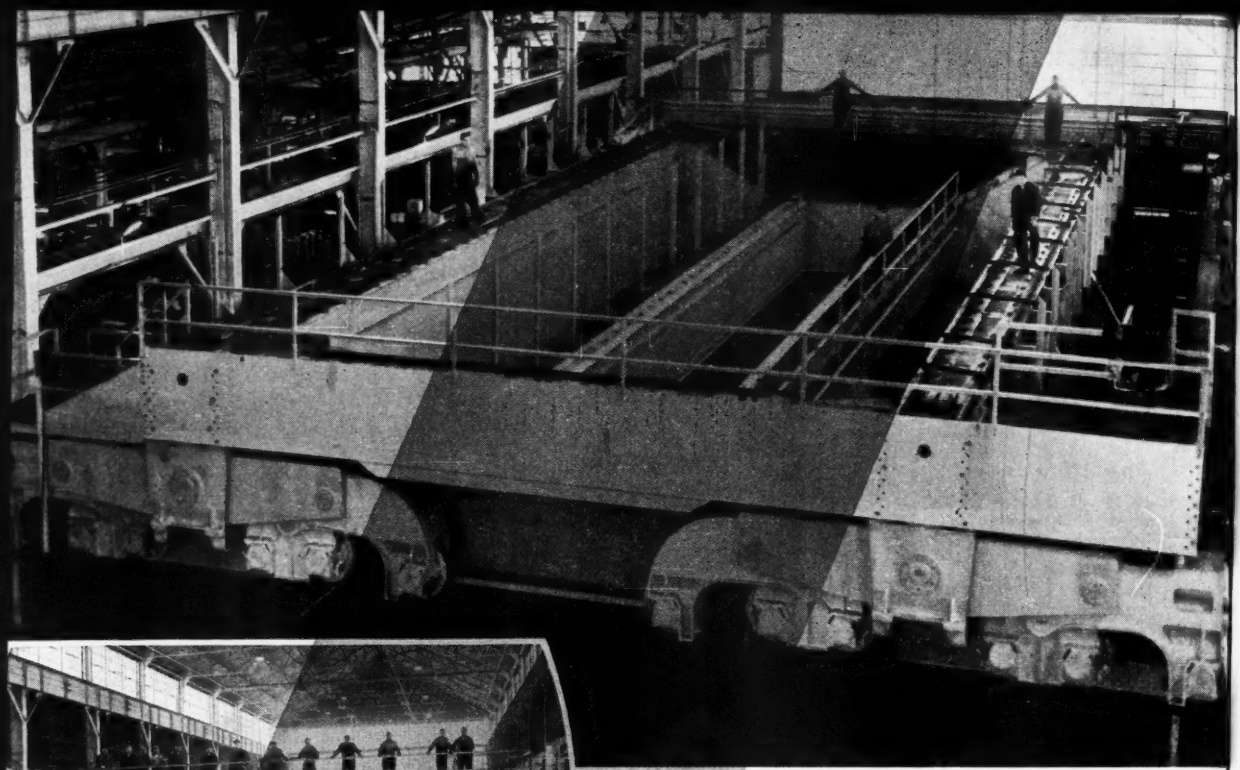
☐ 14" DRILL PRESSES

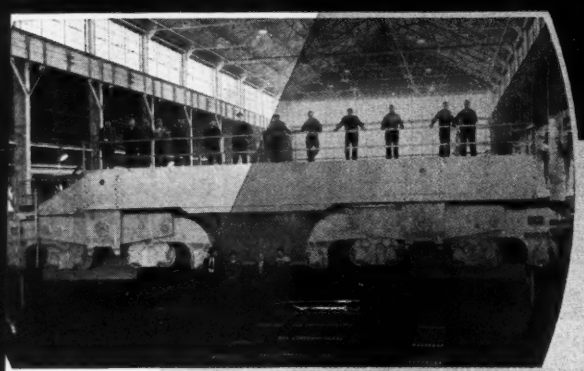
☐ 7" BENCH SHAPERS

Name_____ Company_____

Street_____ City & State_____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana





BRIDGE SPAN 76 FEET, OVERALL WIDTH 60 FEET

world's biggest ladle crane gets final inspection . . . . it's 350/60/25 TON ALLIANCE BUILT

● You're looking at two pictures of the world's largest ladle crane, shown, during final assembly, on the erection floor of the Alliance Machine Company.

This 350/60/25-ton, 4-girder, vibration-free giant will soon be helping one of the world's largest steel producers increase production capacity.

It's equipped with 24 track wheels on the bridge. The crane is so designed that each track wheel bears exactly 1/24th of the total load. And, like all Alliance Cranes, built for handling hot metals, raw materials, and finished products, it's safer, easier to operate and many times more efficient.

even bigger model now being built

The never-ending demand for bigger, better lifting power has kept Alliance on a constant path of research and development. For more than 50 years, Alliance has been the world's largest producer of the world's largest cranes.

Now in production are three 450-ton, 4-girder Alliance ladle cranes. These will be the largest ladle cranes ever built.

Let Alliance engineers help you with your heavy material handling problems. Write us today for an early consultation.

THE Alliance MACHINE COMPANY

World's largest builders of world's largest cranes

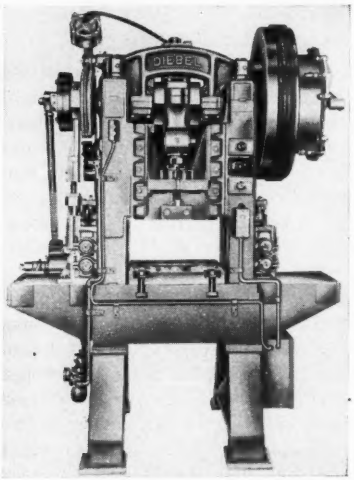
MAIN OFFICE
ALLIANCE, OHIO • PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

Press Stamps Intricate Parts

USE REPLY CARD—CIRCLE No. 1

Automatic 40-ton stamping press, made by Di Machine Corp., 2711 W. Irving Park Rd., Chicago 18, Ill., features extreme rigidity to help extend die life. The press, designated Diebel Di-matic, is designed to stamp intricate



. . . safety shutoff protects press and die

parts from complicated progressive dies. It has four main crankshaft bronze bearings, and air-operated, electrically controlled friction clutch and brake and an air ejector and cam. Adjustable retainer with 380-sq in. contact area guides its 16-inch cylindrical slides.

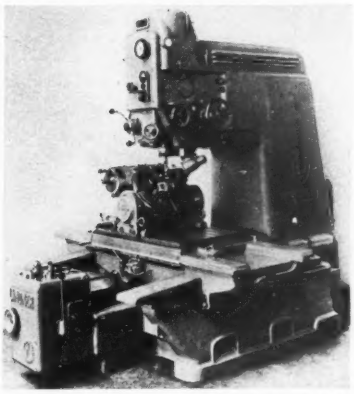
Air clamped roll feed is driven by rack and pinion. Other features include a meter lubrication system, knockout bars for compound dies, built-in scrap cutter and a 5 hp vari-drive motor. Protection for press and dies is provided by a safety device in the electrical control circuit.

Jig Borer Has Fine Adjustment

USE REPLY CARD—CIRCLE No. 2

Table settings accurate to ±0.00032-inch are provided by direct-reading micro-optical measuring system built into a German-made Lindner jig borer, distributed in the U. S. by Kurt Orban Co. Inc., 205 E. 42nd St., New York 17, N. Y. Maximum error between two bore holes is held within ±0.0004-inch. Rotatable cylinders, connected to co-ordinate slides, permit intermediate measurements from thread to thread to be set on an annual scale to ±0.00004-inch and read through the microscope. Absence of mechanical wear on the measuring system assures adjustment accuracy throughout machine's life.

Single column design and open construction make the borer adaptable to precision boring of bulky pieces or heavy roughing operations with equal efficiency. Infinitely variable spindle speeds



. . . table settings accurate to 0.00032-inch

from 50 to 1900 rpm in model 15 and 70 to 2000 rpm in the model 14 are available. Model 15 has table movement of 40 x 24 inches; model 14, 24 x 16 inches.

Machine Runs Two or More Nuts

USE REPLY CARD—CIRCLE No. 3

Ingersoll-Rand Co., 11 Broadway, New York, N. Y.. offers multiple nut runners for running two or more nuts simultaneously. Correctly spaced and mounted individual runners are connected to a common manifold, mounted on the machine. The unit is provided with a common set of handles. Because runners are used with spring balancers, weight of the combined tools offers no objection.

Principal benefits attributed to the units are: High quality control from uniform torque; time-saving from multiple operations; increased operator safety through absence of torque reaction; and operating simplicity. Tools are all supplied with air from a common backhead and air pressure is adjusted so tools stall at the required torque. Thus, all nuts are run to precisely the same degree of tightness. Machines are built to fit specific jobs where duplicate operation can be eliminated by their application.

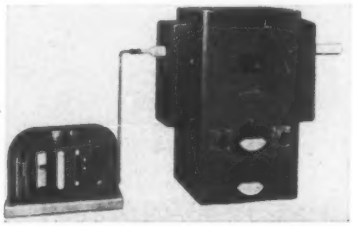
REPLY CARDS

on page 129 will bring you more information on any new products and equipment in this section.

Unit Determines Carbon Content

USE REPLY CARD—CIRCLE No. 4

Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa., offers its Carbotrane, a unit-package carbon train for improved gravimetric determination of carbon-by-combustion. A self-contained apparatus, it employs replaceable glass cartridges that contain reagents commonly used in determining carbon in metals. Two models are available: Single train, model 110, for



. . . four absorption tubes make up the train

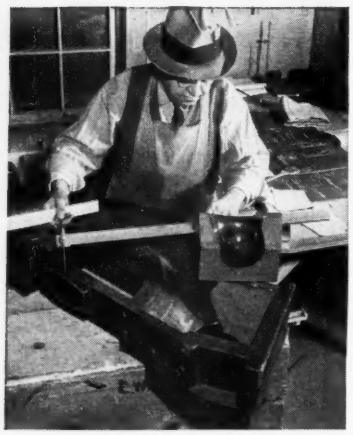
average laboratory use; double train, model 120, for high production or standby convenience. Determinations can be made simultaneously with the double train model. Units are applied with either resistance or high-frequency combustion furnaces.

Built in timers, with 5-minute range, regulate periods of combustion. Timers on the double train

LEBANON CIRCLE L Castings

in Stainless and Special Alloys . . .

with Controlled High Quality



Lebanon Steel Foundry pattern makers study engineering designs, suggest improvements and plan jobs for production giving careful consideration to feed heads, rigging and gating. This care in preparation can save valuable time and eliminate costly failures. Pattern making, however, is but one of many steps in production rigidly followed by Lebanon craftsmen to provide CIRCLE Ⓛ castings of *controlled* high quality.

LEBANON STEEL FOUNDRY

Dept. B, Lebanon, Pennsylvania

"In the Lebanon Valley"

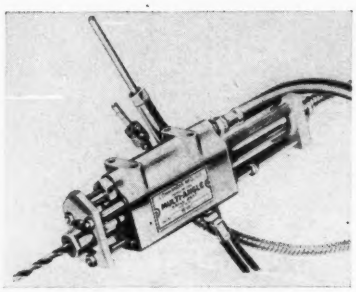
CIRCLE L LEBANON *Steel and Alloy Steel* Castings

model operate independently of each other. All contacts between tubes and train are leak and pressure-proof. Connections between absorption tubes are made of short seamless metal tubing soldered in place.

Multi-Angle Drilling Unit

USE REPLY CARD—CIRCLE No. 5

Multi-angle drilling unit, with 4-inch stroke, is offered by Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24, Ill. Unit is a complete drilling head, powered through flexible shafting, that can be attached to drill press or other source to give unlimited freedom of angle drilling setup. After any part is run, drill can be reset or



. . . rapid setup for holes at any angle

readjusted rapidly for another job. Because operator controls advance, drill can be withdrawn to clear chips whenever desired.

A precision production tool, it has hydraulic actuated spindle movement, adjustment stops in both directions and thrust ball bearing construction. Spindles available are the collet type from No. 80 to ⅜-inch and No. 1 Morse taper.

Locomotive Governor Improved

USE REPLY CARD—CIRCLE No. 6

Improved locomotive governor, developed by General Electric Co., Schenectady 5, N. Y., for use on the Alco-Ge 1600-hp road locomotives, can now be installed on earlier locomotive models through use of an adapter kit. In this advanced model, electrical components are simplified and fewer moving parts used. Speed pilot valves and fuel limit pilot valves are made identical and separate parts stocks are unnecessary. These valves can be removed from the top of the governor as a unit. External piping is reduced by building the oil reservoir into the unit base and eliminating the separate reservoir formerly mounted on the locomotive's floor. Visible sight glass replaces the dipstick method of checking oil. Wiring is simplified through eliminating governor-off switch, its function being served by another switch in the circuit.

Sparkless, Vari-Speed Motor

USE REPLY CARD—CIRCLE No. 7

Explosion-proof, variable speed motor is offered by U. S. Electrical Motors Inc., 200 E. Slauson Ave., Los Angeles 54, Calif. Self-contained design differs from conventional method of connecting an explosion-proof motor with a separate speed changer. Unit is mounted in one frame and occupies a single base, saving space and eliminating intermediate connections.

Motor element is totally enclosed. Air movement is blasted over the enclosed unit from the exterior by a spark-proof fan housed in the end sector. Control dial provides speed change instantly. When gear reductions are necessary they are incorporated as an integral unit of the drive. Motor is available in output speeds from 2 to 10,000 rpm, in ratings from 1 to 20 hp.

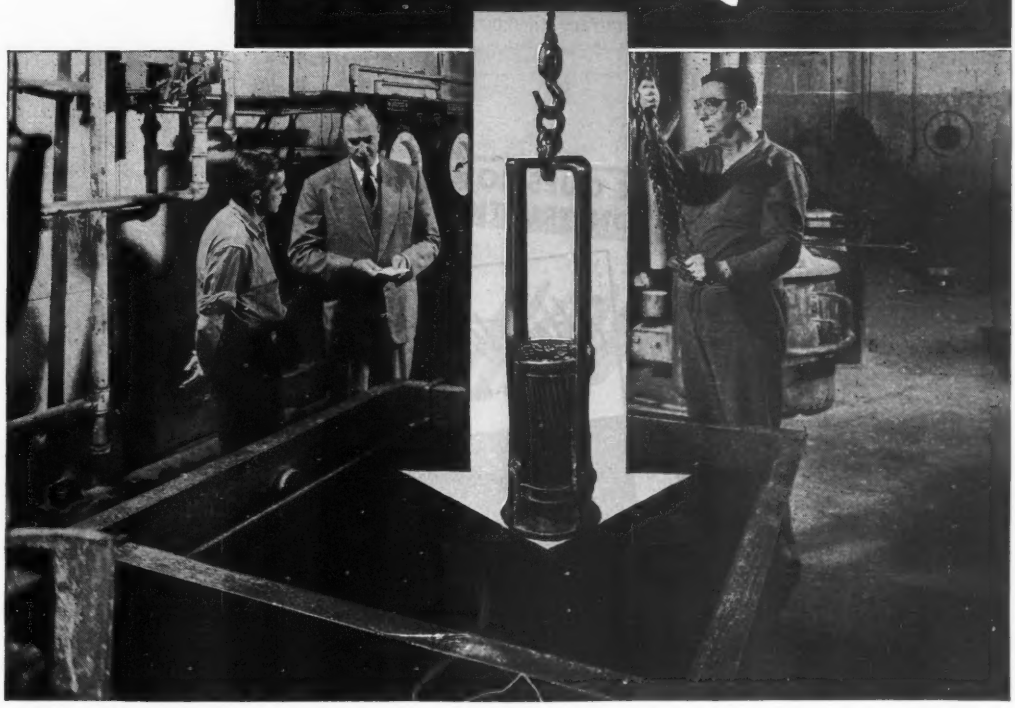
Collector Capacity Is 3630 cfm

USE REPLY CARD—CIRCLE No. 8

Industrial dust collector made by Aget-Detroit Co., Ann Arbor, Mich., takes 8 sq ft of floor space for rated capacity of 3630 cfm at static suction of 6 inches measured on an 8-inch inlet pipe. This capacity permits use with six large disk grinders or six grinding wheels to 20 inches diameter.

Air is drawn into the collector by a self-clearing paddle wheel, driven by a 5-hp motor. Cyclone separator of predetermined operating efficiency is the first stage cleaner; heavily-compressed fiberglass filter comprises the second stage. Filter cleans the air and permits its return to the working space for a consequent saving of heat. No connections to out-of-doors are needed. Unit is self-contained, portable, and can be

Cut quenching costs, reduce rejects on steels of critical hardenability with GULF SUPER-QUENCH



Is the current alloy shortage creating a heat-treating problem for you? Must you accept alloy steels with less chromium, manganese, molybdenum, or vanadium than you originally specified? Then you'll be interested in the performance of Gulf Super-Quench. Because of its dual-quenching power, this outstanding oil helps offset the lower hardenability of today's substitute steels.

Gulf Super-Quench passes through the vapor stage far more quickly than conventional quenching oils. This means that the cooling rate is extremely fast at the outset, an important factor in the depth and uniformity of hardening. In the succeeding stages Gulf Super-Quench has a slow cooling rate, like that of conventional quenching oils, and therefore has the same minimum tendency toward distortion and cracking of the metal parts.

Greater quenching power of Gulf Super-Quench adds up to greater depth of hardening and more uniform hardness! This means fewer rejects and lower quenching costs. One of the most practical advantages of Gulf Super-Quench is greater uniformity of results on steels of variable hardenability.

For further information on Gulf Super-Quench, call in a Gulf Sales Engineer today.

Gulf Oil Corporation · Gulf Refining Company
Gulf Building, Pittsburgh 30, Pennsylvania

GULF SERVES INDUSTRY

moved to accommodate production setup changes. Overall height is 132 inches. Collector operates on 220-440 v, 3-phase, 60-cycle power.

Drill Has Broad Work Range

USE REPLY CARD—CIRCLE No. 9

Black Drill Co. Inc., 1400 E. 222nd St., Cleveland, O., offers a drill unit combining features of its standard traversing motor shaft type drill with 4-inch work travel and skip stroke attachment. These qualities make it suitable for deep drilling, drilling in difficult locations and accurate work in materials that require frequent chip clearing.

Made in ¼ to 5 hp sizes, the unit is designed to operate in any position. Air feed provides rapid shockless advance to the work. Hydraulic control results in uniform drill feed even when breaking through. Calibrated stop control is included to ease adjustment; micrometer stop insures depth accuracy to 0.001-inch. From one to six easily adjusted skip stroke stops are provided.

Tractor Shovel Is Bulk Mover

USE REPLY CARD—CIRCLE No. 10

Frank G. Hough Co., 876 Seventh St., Libertyville, Ill., announces an addition to its Payloader shovel line. Four-wheel drive tractor operates on 60 hp diesel or 54 hp gasoline power, carrying a 1 cu yd bucket. Pneumatic tires, same size all around, with drive on all four wheels give the loader sufficient traction to work effectively in sand, mud and snow and travel on pavements without injuring the surface.

. . . operates on diesel or gasoline power

Rear wheel steering with power booster, plus short wheel base add to operating ease and maneuverability.

Four speeds forward and reverse combine with finger-tip control hydraulic power for raising and lowering, dumping and closing the bucket to provide fast operating speed. Automatic digging action is independent from forward motion. Twin hydraulic boom rams are double acting, as is the ram that dumps and closes the bucket.

Heavy Industrial Brake

USE REPLY CARD—CIRCLE No. 11

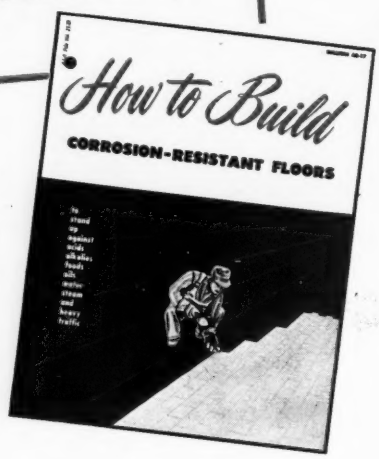
A large size electric brake for heavy industrial purposes is available from Warner Electric Brake & Clutch Co., Beloit, Wis. It makes it possible to convert to electrical stop and start equipment where mechanical and hydraulic systems were used.

Locates Fatigue Cracks

USE REPLY CARD—CIRCLE No. 12

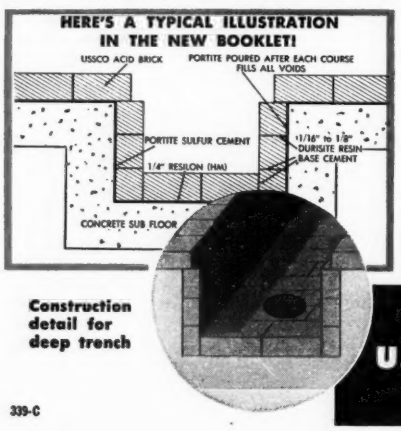
A penetrant dye inspection process for nondestructively finding surface defects in any metal without special equipment is announced by Met-L-Chek Co., Hawthorne,

THE ANSWERS TO THESE QUESTIONS ON ACID-BRICK FLOOR CONSTRUCTION ARE YOURS FOR A THREE-CENT STAMP



- HOW TO LAY AN INEXPENSIVE, IMPERMEABLE MEMRANE.
- HOW THIN JOINTS CAN BE EASILY MADE.
- SHOULD YOU TRY TO GET BY WITH BUTTERING BRICK ON FOUR SIDES ONLY?
- WHAT'S THE SIMPLEST WAY TO BUILD A COVE BASE?
- CAN YOU SAFELY INSTALL AN ACID-BRICK FLOOR OVER AN OLD CONCRETE SUB-BASE?
- HOW TO SELECT THE RIGHT BRICK FOR THE JOB.
- ARE EXPANSION JOINTS NECESSARY?
- WHAT'S THE BEST CONSTRUCTION FOR PIERS? MOTOR SUPPORTS? TRENCHES?

The money-saving answers to these questions, and many more, are found in our new booklet "How to Build Corrosion-Resistant Floors." In its 16 pages you will find the full story on the construction of acid-and-alkali-resistant brick floors. Every detail is covered — every important point thoroughly described and discussed. Photographs, sketches, engineering drawings — all are used to give you a clear, concise picture. Get your copy today — it's free on request.


HERE'S A TYPICAL ILLUSTRATION IN THE NEW BOOKLET!
USSCO ACID BRICK
PORTITE POURED AFTER EACH COURSE FILLS ALL VOIDS
PORTITE SULFUR CEMENT
1/4" RESILON (Min)
11/16" to 1 1/8" DURISITE RESIN BASE CEMENT
CONCRETE SUB FLOOR

Construction detail for deep trench

Write U. S. Stoneware Co., Process Equipment Division, Akron 9, Ohio.

Engineers, Manufacturers, Erectors of Corrosion-Resistant Equipment since 1805.

U. S. STONEWARE
AKRON 9, OHIO

339-C

Here's a timesaver you'll find invaluable . . .

Containing much salient data on "specs," this new Frasse chart will prove a boon when you're working with stainless steels. With it a specified steel can easily be identified in less than 30 seconds—saving valuable time normally spent thumbing through individual specifications.

Compiled by Frasse Technical Service, the chart shows chemical analysis requirements for each of 37 Military, Army, Navy, Aeronautical, and Federal specifications. Also lists specified forms (bars, wire, etc.) and nearest corresponding SAE, AISI and AMS type numbers.

Printed on durable cardboard stock, the chart is regular file card size—can be tacked on wall, filed in desk drawer, or slipped under glass for ready reference.

It's furnished without charge, of course—so make your job an easier one! Send the coupon below for this helpful chart today—and remember that Frasse Technical Field Service is always available to assist you in applications involving stainless steels. *Peter A. Frasse and Co., Inc., 17 Grand St., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange St., Buffalo 3, N. Y. (Washington 2000) • 157 Richmond Ave., Syracuse 4, N. Y. (Syracuse 3-4123) • Hartford • Lyndhurst Rochester • Baltimore.*

Call FRASSE 1st for STAINLESS STEEL

Bars • Sheets • Strip • Plates • Angles
Wire • Tubing • Pipe • Fittings

Peter A. FRASSE and Co., Inc. 3J
17 Grand Street
New York 13, N. Y.

Gentlemen: Please send me, without obligation, a copy of your new data chart, Sec: A No. 2, showing Government "specs" for stainless steels.

*Name*_____ *Title*_____

*Firm*_____

*Address*_____

CARS, CLIPS,

CANISTERS

&

CONTINUOUS

FEEDING

FOLLANSBEE COLD ROLLED STRIP is widely used wherever high-speed automatic machines turn out products in great numbers. Continuous feeding from coils is essential to maintaining volume like this. That's why Follansbee Cold Rolled Strip is furnished in continuous coils that keep automatics in action for real productioneering teamwork.

Follansbee Cold Rolled Strip Steel is manufactured to specifications, in tempers and finishes for most industrial applications. Let the nearby Follansbee Representative tell you about Follansbee Steel Service, tailored to fit *your needs.*

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

SEAMLESS TERNE ROLL ROOFING • COLD ROLLED STRIP
POLISHED BLUE SHEETS AND COILS

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Mills*—Follansbee, W. Va.

Follansbee Metal Warehouses—Pittsburgh, Pa., Rochester, N. Y., and Fairfield, Conn.

Calif. The dye is applied to the clean surface to be tested and after a few minutes is removed by water or solvents. Developer is then applied and the exact location and extent of any surface defects are outlined clearly in red on a white background.

Branch Circuit Extensions

USE REPLY CARD—CIRCLE No. 13

Known as NE Rolla-Duct series, portable branch circuit extensions are introduced by National Electric Products Corp., Pittsburgh, Pa. Series include a power and light unit, a strip of flood lighting and a strip of infra-red heating units. Strips are fully grounded and provided with a circuit breaker incorporated in the strip for worker protection.

Galvanized-Steel Angle

USE REPLY CARD—CIRCLE No. 14

DexAngle, a 10 foot long, 3 x 1.5 x 0.080-inch slotted leg galvanized-steel angle for all purpose industrial fabrication is available from Acme Steel Co., Chicago 8, Ill. A hacksaw and wrench are the only tools needed for assembly. Lengthwise rows of slots permit rapid assembly by bolting of shelving, bins, scaffolding, assembly tables, motor and machinery mounts, etc.

Dumps Scrap, Small Parts

USE REPLY CARD—CIRCLE No. 15

Palmer-Shile Co., Detroit 27, Mich., offers a multipurpose cart for dumping of scrap, small parts and other materials. Design and balance insure easy wheeling of the all-welded unit.

Hand Operated Knurler

USE REPLY CARD—CIRCLE No. 16

M.P.A. Co., Los Angeles 6, Calif., offers a hand operated knurler that may be used with a lathe, drill press or the work can be held in a vise and knurler rotated

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

71. Stainless Valves, Fittings

Cooper Alloy Foundry Co.—"Valve Topics" is title of a new periodical published for those who design, specify, use or purchase stainless steel valves and fittings. It will provide info on uses of these valves, application stories and such editorial features as Items of Interest, Questions and Answers and Technical Topics.

72. Dust Collectors

Torit Mfg. Co.—Here is an all-inclusive catalog that covers both cabinet and cyclone type dust collectors, made in sizes ranging from 1/3 to 5 hp. Also included in 24-page illustrated bulletin No. 36 is line of fittings and accessories, plus sketches with overall dimensions.

73. Rust Preventive Paints

Rust-Oleum Corp. — Rust-Oleum stops rust! That's what 16-page form 251 says about this rust preventive that serves effectively under all kinds of rust-producing conditions. Booklet features series of color charts along with complete information on applications, resistant qualities, drying time and type thinner to use with each kind of paint.

74. Lift Your Load

Raymond Corp.—Strip and sheet feeding operations are simplified when hydraulic elevating tables are employed. These tables are also ideal for die handling and work positioning. You will find complete information on variety of models with various elevations and capacities from 2000 to 20,000 lb in 4-page illustrated bulletin 206.

75. Sheet Metal Machinery

Maplewood Machinery Co.—Whether its beading, wiring, crimping, flanging or roll forming that's involved in your sheet metal fabricating operations, there's a proper size and type machine for you in 30-page loose-leaf catalog entitled "Power and Hand-operated Equipment." In addition to giving complete specs on machines, bulletin lists available sheet metal fabricating tools and supplies. Get your copy now!

76. Press Brakes

Verson Allsteel Press Co. — Both mechanical and hydraulic type press brakes with capacities from 15 tons up are covered in 20-page illustrated catalog B-51. You also get design details and specification for entire line.

77. Temperature Takers

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—18-page technical bulletin B15-13 is packed with information and suggestions regarding the operation, maintenance and application of Brown ElectroniK potentiometers. It discusses the characteristics of measuring circuits for use with these indicating, recording and controlling instruments.

78. Drag Line Bucket Chains

Taylor-Wharton Iron & Steel Co.—Bulletin No. 552, fifth in series of bulletins on company products, deals with Tisco manganese steel drag line bucket chains. Dimension table on eight sizes is presented.

79. Speed Reducers

Winfield H. Smith Corp.—Custom applications calling for speed reducers can be served by Winsmith standardized line of components assembled from stocked parts into a standard unit. Pocket-size folder covers four basic designs made in ratings up to 85 hp: differential, worm gear, helical gear and worm-helical reducers.

STEEL 2-25-52
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME _____ TITLE

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

This card MUST be completely filled out. Please TYPE or PRINT.

1	11	21	31	41	51	61	71	81
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

STEEL
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

80. Electronic Control

Swartwout Co.—The Autronic principle and how Autronic control system utilizes electronics for automatically measuring and controlling process variables such as temperature, pressure, level and flow are effectively explained in 6-page release A-703. Components of system are illustrated and unit installation is shown.

81. Mill Motor Brushes

National Carbon Co.—You can now get catalog section B-0635 which lists complete line of National mill motor brushes built to conform to AISE specifications. Standard numbers, code numbers, corresponding company brush numbers, brush sizes, grades and costs are all included.

82. Rubber Linings

Metalweld, Inc.—How rubber lined steel affords complete protection from attack by acids, salts, corrosive chemicals, alcohols, oils and other products is related in 4-page bulletin "Rubber Linings." Various types of linings which can be applied are described.

83. Wire Rope Assemblies

Macwhyte Co.—24-page illustrated bulletin 5201 catalogs complete line of wire rope assemblies for machine parts and operating devices. Among the available terminals offered in these units are pine, oval, small ring and large ring eyes; threaded studs and sleeves; standard and connector sleeves; standard and safety hooks; and forks. Assemblies are used as slings, operating controls and as part of machinery and equipment.

84. Powered Floor Sweepers

Wilshire Power Sweeper Co.—Power sweepers illustrated and described in 4-page bulletin S-101 can make it possible for you to reduce your sweeping costs by as much as 75 per cent. Comparative operating data are given as guide to selecting correct model and size for specific requirements.

85. Centrifugal Oil Purifiers

Sharples Corp.—Here is 4-page bullet 1264 which covers centrifugal type continuous oil purifiers for diesel fuel and lubricating oils; cutting, quenching and other industrial oils. You'll find a method of operation, procedure for 15-minute cleaning, capacities and specifications for models with or without built-in electric heaters.

86. Designing of Springs

Peck Spring Co.—Want some information pertinent to design and development of springs? Then send for 4-page folder entitled "Ways to Cut Costs with Simplified Design." Information set forth is accumulation of over 30 years' experience in fabrication of spring products. Summary of company facilities is included.

EDITORIAL REPRINTS:

87. High Strength Bolts

Here's a reprint of an article entitled "High Strength Bolts" which appeared in STEEL's December 24th issue. It points out advantages and long range economy of using bolts in structural work. Classes of structures considered are those subjected to fluctuating dynamic loading, such as bridges and certain industrial equipment, and those subjected to static loading.

88. Future for Metalworking

Reprint entitled "Metalworking's Destiny" forcefully points to the gradual loss of industry's most valuable asset—the incentive to produce. Editorial, however, optimistically sets forth broad, far-reaching steps nation must take to restore this incentive and to realize its industrial destiny.

89. Who's Who In Defense

If you find it necessary to contact key government defense personnel on matters pertinent to your segment of metalworking, you'll find this directory entitled "Who's Who in the Defense Organization" very helpful. Names were obtained from Office of Defense Mobilization and compiled by STEEL according to the various agencies.

90. Metal Working Data

Now available to STEEL readers in reprint form is the 48-page fourth edition of "Metalworking Facts & Figures" which tabulates latest statistics. Contents trace raw materials all the way through to end products of metal consuming industries. Related subjects such as labor, prices, and earnings are covered as well.

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

STEEL
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

1	11	21	31	41	51	61	71	81
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

STEEL 2-25-52
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

This card MUST be completely filled out. Please TYPE or PRINT.

around it. It does not require work to run dead true as it knurls concentric surfaces and surfaces that are off center. Adjustable, it will accommodate parts ranging from 5/32 to 2-inches in diameter.

Center Withstands Heat, Wear

USE REPLY CARD—CIRCLE No. 17

DoAll Co., Des Plaines, Ill., introduces the Super-Center, a dead center made from Exmet, an alloy that withstands high speed and high temperature. Centers are available in all sizes of Morse, Brown & Sharpe and Jarno tapers, both in conventional styles for lathes and in a gashed type for grinding operations or turning where extra clearance is needed.

Line of Air Cylinders

USE REPLY CARD—CIRCLE No. 18

A line of air cylinders comprising 28 models, each in nine bore diameters, is introduced by Rivett Lathe & Grinder Inc., Boston, Mass. Keeper rings are used to hold covers together which permits covers to be rotated to convenient pipe locations and cylinder applied in a minimum of space. Devices are recommended for pressures to 150 psi and are available in seven mounting styles.

Self-Setting Clamps

USE REPLY CARD—CIRCLE No. 19

Self-setting clamps for presses and machine tools, available from Alpha Tool & Supply Co., Westwood, N. J., eliminate packing and save setting time. Constructed on a design based on the use of three interrelated curved contact surfaces allows each clamp a gripping capacity for a wide range to accommodate various thicknesses of bolsters. Autoset clamps are made in sizes ranging from 3 inches long with 1⅛-inch height capacity to 8 inches long with 3¾-inch height capacity.

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

When you need circular rolled and welded steel products in volume, pick up your phone and call the Cleveland Welding Company, Cleveland, Ohio, Woodbine 1-2820. The man you talk to will be a specialist in the mass production of these items, and with specialized equipment plus over 40 years experience, he has the necessary know-how to solve your welded steel, hoop, band and ring problems economically and efficiently. Each year we manufacture millions of steel rings for jet aircraft engines, bogie bands and turret rings for tanks as well as other types of rings, bands and weldments from alloy and carbon steels.

Many leading armament manufacturers have found that because of our mass production and years of experience, we can often quote a lower price than their own internal costs. Phone or mail us details on your volume requirements and let us quote.

THE CLEVELAND WELDING CO.
West 117th St. and Berea Road • Cleveland 7, Ohio
a subsidiary of
AMERICAN MACHINE & FOUNDRY COMPANY

FOR THE PURCHASE OR SALE OF

IRON AND STEEL SCRAP

LURIA BROTHERS AND COMPANY, INC.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA.
READING, PENNA.
DETROIT (ECORSE), MICHIGAN
MODENA, PENNA.
PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	CLEVELAND, OHIO	LOS ANGELES, CAL.	READING, PENNA.
BOSTON, MASS.	DETROIT, MICH.	NEW YORK, N. Y.	ST. LOUIS, MO.
BUFFALO, N. Y.	HOUSTON, TEXAS	PITTSBURGH, PA.	SAN FRANCISCO, CAL.
CHICAGO, ILLINOIS	LEBANON, PENNA.	PUEBLO, COLORADO	SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

ADDITIONAL signs of easiness are discernible in the steel markets. Not only are certain tonnage products, such as cold-rolled sheets and strip, in relatively plentiful supply at most consuming points, but demand pressure is definitely off. Reports now are heard of price concessions and freight absorption by some warehouses as competition for orders gains momentum. Although the mills are heavily booked up through second quarter on virtually all major products, they are increasingly apprehensive over prospects for the last half of the year.

SCRAP—Currently, the situation in the iron and steel scrap market is being watched closely for a clue to the future trend of business. In the past, scrap has been one of the most reliable business barometers. Recently there have been signs of a slowing down in demand for scrap despite continued tight supply conditions in the steel mill grades. Buyers now are not pressing as hard for tonnage as they were a few weeks back. Fewer government allocations are being sought. Upgrading is fading and mills are more particular about the quality of material accepted. Cast iron grades are in plentiful supply. Buyers are placing a ceiling on the freight they will pay, equivalent to a reduction in delivered prices. This reflects sluggish demand from the foundries. At some points, however, dealers report a spurt in demand for electric furnace grades over the past week.

CHANGING TIMES—Even the possibility of an early general increase in steel prices accompanying a wage boost is not stimulating forward coverage by consumers. Such, however, is believed to be retarding order cancellations and deferments of nearby tonnage, noted of late especially in the light, flat-rolled products. More surplus steel is appearing on the market. For example, a large automobile builder is currently reported trying to peddle 45,000 tons of sheets which it acquired in the conversion market some time ago.

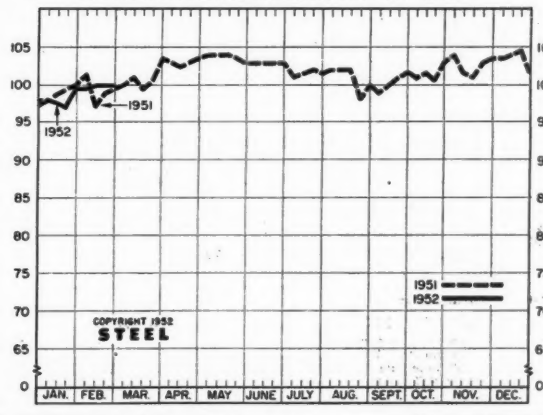
PROBLEMS—Curtailed consumption in the Detroit area is creating some new problems for district steelmakers. Most serious is the need to organize a sales approach to industries other than automotive. This is not easy. Still more distressing to the Detroit district mills is the fact they are unable to dispose of substantial sheet tonnage to prospective customers because the latter lack CMP tickets. Meanwhile, these same buyers can bring in imported steel, one instance of this kind involving 1500 tons. That such a situation prevails is regarded as reason enough for decontrolling cold-rolled sheets and strip. On the other hand, however, there is strong suspicion that decontrol might not appreciably stimulate demand from makers of civilian goods.

ALLOCATIONS—Distribution of controlled materials held in reserve for adjustment and appeals for second quarter was announced last week. Supplemental allotments include additional quantities of structural steel for industrial construction, aluminum for industrial equipment, and brass and aluminum for consumer goods. Included is a previously announced allotment of 1 million pounds of aluminum to the automobile industry. The additional metals were made available through distribution of the reserves set aside when second quarter allotments were first made. The additional steel, copper and aluminum amounts to about 1 per cent of total supply and will cause no significant changes in program levels.

PRODUCTION—Any letdown which may materialize in demand for steel over coming weeks will not be reflected immediately in steelmaking operations. Orders on producers' books assure a high rate of production through second quarter. What will happen in third and fourth quarters has the industry guessing. Some producers are beginning to accept orders for third quarter, but this is not yet general. Last week the national ingot rate held unchanged at 100 per cent of capacity.

PRICES—Aside from changes in warehouse steel prices in line with monthly adjustments under government ceiling regulations, steel and related product prices hold unchanged.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Feb. 23	Change	Same Week 1951	Same Week 1950
Pittsburgh	100.5	— 1*	100.5	87.5
Chicago	101.5	0	102	92
Mid-Atlantic	98	— 1	99.5	73
Youngstown	102	0	102	75
Wheeling	100	+ 1	95	90
Cleveland	98.5	+ 0.5*	97.5	97
Buffalo	104	0	104	96
Birmingham	104	0	100	82
New England	88	0	90	78
Cincinnati	89	— 1	88	96
St. Louis	68.5	— 9	87	89
Detroit	101.5	0	109	106
Western	106	+ 2	104	88
Estimated national rate	100	0	99.5	85.5

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 39 Production-Engineering News—p. 75

Composite Market Averages

FINISHED STEEL INDEX, Weighted:	Feb. 21 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)..	171.92†	171.92†	171.92†	171.92	118.67
Index in cents per lb.	4.657†	4.657†	4.657†	4.657	3.215
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32†	$106.32†	$106.32†	$106.32	$69.73
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT.....	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT....	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	43.00	43.00	43.00	44.00	33.75

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Feb. 21 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh.....	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago.....	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh...	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia...	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh...	3.60–75	3.60–75	3.60–75	3.60–75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh...	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh..	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.60	3.35
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.90-6.20	4.125
Tin plate box, Pittsburgh..	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts.(NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜-⅝", Pitts...	4.10–30	4.10–30	4.10–30	4.10–30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	32.01
No. 2 Fdry, Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry, Del. Phila....	57.11	57.11	57.11	56.89	32.51
No. 2 Fdry, Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	55.58	31.75
Malleable Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.00*

* F.o.b., Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts...	$44.00	$44.00	$44.00	$45.00	$35.00
No. 1 Heavy Melt. E. Pa...	42.50	42.50	42.50	43.50	34.00
No. 1 Heavy Melt. Chicago.	42.50	42.50	42.50	43.50	32.50
No. 1 Heavy Melt. Valley..	44.00	44.00	44.00	45.00	35.00
No. 1 Heavy Melt. Cleve...	43.00	43.00	43.00	44.00	32.50
No. 1 Heavy Melt. Buffalo.	43.00	43.00	43.00	44.00	35.00
Rails, Rerolling, Chicago...	52.50	52.50	52.50	52.50	38.50
No. 1 Cast, Chicago.....	49.00*	49.00*	49.00*	49.00*	42.50

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connisvl...	$14.75	$14.75	$14.75	$14.75	$8.75-$9
Beehive, Fdry., Connisvl...	17.50	17.50	17.50	17.50	9.75-10.00
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50-20.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	12.80–85
Tin, New York 121.50	121.50	121.50	183.00	70.00	
Aluminum, del	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ...	50.00	50.00	50.00	42.00	28.25
Nickel, refinery, duty paid.	56.50	56.50	56.50	50.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill., Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52 00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.50	58.00	....
Fontana, Calif. K1	58.00	58.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
Los Angeles, San Francisco, del. ...	60.16	60.66	....	....
Granite City, Ill. G4	53 90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah, C11	52.00	52.50	....	....
Geneva, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Braokenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

(Material in this department is protected by copyright and its use in any form without permission is prohibited)

Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Feb. 21, 1952; cents per pound except as otherwise noted. Changes shown in Italics.
Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ...75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2.56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So. Duquesne,Pa. U5 ..56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah C11 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14.66.00
So.Duquesne,Pa. U5 ..66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston, Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ..70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14.70.00
So.Duquesne,Pa. U5 ..70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ..82.00

SHEET BARS (NT)
Fontana,Calif. K1 ..$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 ...3.35

WIRE RODS
Alton,Ill. L1 .....4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 .....4.10
Los Angeles B3 .....4.90
Minnequa,Colo. C10 ...4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ..4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So. Chicago, Ill. R2 ....4.10
SparrowsPoint,Md. B2..4.20
Sterling,Ill.(1) N15 ...4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ...4.40

SHEET STEEL PILING
Ind.Harbor,Ind I-2 ....4.45
Lackawanna,N.Y. B2...4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah C11 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ...3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minneque,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ...5.90
Portland,Oreg. O4 ....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14.3.65
So.SanFrancisco B3 ...4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ...3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Ind. Harbor,Ind I-2 ...5.50
Ind.Harbor,Ind. Y-1 ...6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5.....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ...6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 .3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago, Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ..5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah C11 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind Y1 ....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So. Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 .....4.75
Johnstown, Pa. B2 ....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa S3 .....5.20
So Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2..4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ..4.75
Ind.Harbor,Ind. I-2 ...4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ..3.95
Ashland,lcl(15) A10 ...4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ..4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif. (30) K1.4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill G4 ....4.40
Geneva,Utah C11 .....3.70
Harrisburg,Pa. C5 ....6.30
Houston,Tex. S5 .....4.10
Ind. Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14.3.70
SparrowsPoint,Md. B2..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah C11 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Kansas City, Mo. S5 ..4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 .....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14.3.70
So.Duquesne,Pa U5 ....3.70
So.SanFran.,Cal. B3....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit, R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2, U5, W14.4.30
So.Duquesne,Pa. U5 ..4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind I-2 ....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa U5 ....5.55
So.SanFrancisco B3 ...6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2 4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 ....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ...4.55
Gary,Ind. R2 .....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Con. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R5 ....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 ....5.10
St. Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3..5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ...5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa.(3,4) F5 ...4.75
FortWorth,Tex.(26) T4..4.85
Huntngtn,W.Va.(3) W7..5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda(3,4) B12 ...4.75
Williamsport(3) S19 ...5.00
Williamsport(4) S19 ...5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt)U1 ...13.50
Dover,(Wrgh.Iron) U1 .12.25
Economy,Pa.(S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt)L5 14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala R2 ...3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ...3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 ....4.65
SandSprings,Okla. S5 ..4.60
Seattle B3, N14 .....4.45
So. Chicago,Ill. R2 ....3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFrancisco B3 ...4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2..4.75
Los Angeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B3 ...5.45
SparrowsPt. ¼-1" B2 ..4.75
Williamsport,Pa. S19 ..5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.60
Ashland,Ky.(8) A10 ...3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ..4.00
Detroit M1 .....4.40
Ecorse,Mich. (8) G5 ....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah C11 .....3.70
GraniteCity, Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1.3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ...3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill W14 ....3.60
SparrowsPoint,Md. B2 ..3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity, Ala. R2 ..4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind I-2 ....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2..5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ...6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ..6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.55
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10.	5.60	..
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2.	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16.	6.25	..
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	..
SparrowsPt. B2.	5.60	..
Torrance,Cal. C11	6.35	..

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower) Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	7.95	9.20	..
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00
Niles,O. N12 (cut lengths)	...	6.75	7.25	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00
Warren,O. R2	6.95	7.25	7.75	9.00
Zanesville,O. A10	...	7.25	7.75	9.00

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2.	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va.W6	8.45	8.70
Yorkville,O. W10.	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2.	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes,6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Comercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.55
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6
Gary,Ind U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6
SparrowsPoint,Md B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2.	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Hardbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2.	3.50
KansasCity,Mo.(9) S5.	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2.	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4.	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Strip Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	..	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

Midland, Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40)T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8.	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliot Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Co.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa.	S18 10.60
Cleveland	A7 10.00
Dover,O.	G6 10.50
Fontana,Calif.	K1 11.65
Harrison,N.J.	C18 10.60
Midland,Pa.	C18 10.60
NewBritn,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa.	S3 10.60
Worcester,Mass.	A7 10.30
Youngstown	C8 10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8)	A10 3.75
Warren,O.	R2 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 4.05
Riverdale,Ill.	A1 3.90
Sharon,Pa.	S3 4.15
Youngstown	U5 3.75

WIRE, Tire Bead

Bartonville,Ill.(1)	K4 10.90
Monessen,Pa.	P16 11.40
Roebling,N.J.	R5 11.55

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2. 5.70	5.95
Aliquippa	J5 5.70	6.15
Atlanta	A11 5.95	6.40
Bartonville(19)	K4 5.70	6.15
Buffalo	W12 4.85	...
Cleveland	A7 5.70	6.15
Crawfordsville	M8 5.95	6.40
Donora,Pa.	A7 5.70	6.15
Duluth,Minn.	A7 5.70	6.15
Fairfield	T2 5.70	6.15
Houston,Tex.	S5 6.10	6.55
Johnstown	B2 5.70	6.15
Joliet,Ill.	A7 5.70	6.15
KansasCy,Mo.	S5. 6.30	6.75
Kokomo	C16 5.80	6.05
LosAngeles	B3 6.65	...
Minnequa	C10 5.95	4.45
Monessen	P7 5.95	6.40
Palmer	W12 5.15	...
Pitts.,Calif.	C11. 6.65	6.80
Prtsmth.(18)	P12 6.10	6.60
Rankin	A7 5.70	6.15
So.Chicago	R2 5.70	5.95
So.S.Fran.	C10 6.65	7.10
SparrowsPt.	B2 5.80	6.25
Sterling,Ill.(1)	N15 5.70	6.15
Struthers,O.	Y1 5.70	6.15
Torrance,Cal.	C11 6.65	...
Worcester	A7 6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill.	L1 8.65	8.90
Bartonville,Ill.	K4 8.55	8.80
Buffalo	W12 8.55	8.80
Fostoria,O.	S1 8.85	9.10
Johnstown,Pa.	B2 8.55	8.80
Monessen,Pa.	P16 8.55	8.80
Monessen,Pa.	P7. 8.80	9.05
Palmer,Mass.	W12. 8.85	9.10
Portsmouth,O.	P12 8.55	8.80
Roebling,N.J.	R5. 8.85	9.10
SparrowsPt.	B2.. 8.65	8.90
Struthers,O.	Y1.. 8.55	8.80
Worcester	J4, T6. 8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2 4.85
Aliquippa,Pa.	J5 4.85
Atlanta	A11 5.10
Alton,Ill.	L1 5.05
Bartonville,Ill.(1)	K4 4.85
Buffalo	W12 4.85
Chicago	W13 5.10
Cleveland	A7, C20 4.85
Crawfordsville,Ind.	M8 5.10
Donora,Pa.	A7 4.85
Duluth,Minn.	A7 4.85
Fairfield,Ala.	T2 4.85
Fostoria,O.(24)	S1 5.35
Houston	S5 5.25
Johnstown,Pa.	B2 4.85
Joliet,Ill.	A7 4.85
KansasCity,Mo.	S5 5.45
Kokomo,Ind.	C16 4.95
LosAngeles	B3 5.80
Minnequa,Colo.	C10 5.10
Monessen,Pa.	P7 5.10
Newark, 6-8 ga.	1-1 5.50
No.Tonawanda	B11 4.85
Palmer,Mass.	W12 5.15
Pittsburg,Calif.	C11 5.80
Portsmouth,O.	P12 5.25
Rankin,Pa.	A7 4.85
So.Chicago,Ill.	R2 4.85
So.SanFrancisco	C10 5.80
SparrowsPoint,Md.	B2 4.95
Sterling,Ill.(1)	N15 4.85
Struthers,O.	Y1 4.85
Torrance,Calif.	C11 5.80
Waukegan,Ill.	A7 4.85
Worcester,Mass.	A7, T6 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 6.20
Buffalo	W12 6.35
Cleveland	A7 5.85
Crawfordsville,Ind.	M8. 6.20
Detroit	D2 6.20
Dover,O.	G6 6.20
Fostoria,O.	S1 6.00
Kokomo,Ind.	C16 5.70
FranklinPark,Ill.	T6 6.20
Massillon,O.	R8 5.85
Monessen,Pa.	P16 5.85
Monessen,Pa.	P7 6.10
NewHaven,Conn.	D2 6.50
Pawtucket,R.I.(12)	N8. 6.85
Trenton,N.J.	R5 6.15
Worcester,Mass.	A7 6.15
Worcester,Mass.	T6 6.50
Worcester,Mass.	W12 6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 8.50
Monessen,Pa.	P16 8.50
Roebling,N.J.	R5 8.80
SparrowsPoint,Md.	B2 8.60
Johnstown,Pa.	B2 8.50

WIRE (16 gage)	An'l'd Stone	Galv. Stone
Aliquippa	J5 10.15	12.15
Bartonville(1)	K4 10.25	11.95
Cleveland	A7 10.25	12.15
Crawfrdsville	M8 10.30	12.00
Fostoria,O.	S1 10.40	13.00
Johnstown	B2 10.25	12.15
Kokomo	C16 10.25	11.95
Minnequa	C10 10.40	12.40
Palmer,Mass.	W12 10.25	12.15
Pitts.Cal.	C11 10.60	12.50
Prtsmth.(18)	P12 10.55	12.30
SparrowsPt.	B2 10.35	12.25
Waukegan	A7 10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa.	J5 6.25
Alton,Ill.	L1 6.45
Bartonville,Ill.(1)	K4 6.25
Buffalo	W12 6.25
Cleveland	A7 6.25
Donora,Pa.	A7 6.25
Duluth,Minn.	A7 6.25
Fostoria,O.	S1 6.25
Johnstown,Pa.	B2 6.25
LosAngeles	B3 7.20
Milbury,Mass.(12)	N6 8.05
Monessen,Pa.	P7, P16 6.25
Palmer,Mass.	W12 6.55
Pittsburg,Calif.	C11 7.20
Roebling,N.J.	R5 6.55
Portsmouth,O.	P12 6.25
So.Chicago,Ill.	R2 6.25
So.SanFrancisco	C10 7.20
SparrowsPoint,Md.	B2 6.35
Struthers,O.	Y1 6.25
Trenton,N.J.	A7 6.55
Waukegan,Ill.	A7 6.25
Worcester	A7, T6, W12 6.55
Worcester,Mass.	J4 6.75

WIRE, Fine & Weaving (8"Coils)

Bartonville,Ill.(1)	K4 8.90
Buffalo	W12 8.90
Chicago	W13 8.90
Cleveland	A7 8.90
Crawfordsville,Ind.	M8. 8.95
Fostoria,O.	S1 8.90
Johnstown,Pa.	B2 8.90
Kokomo,Ind.	C16 8.90
Monessen,Pa.	P16 8.90
Palmer,Mass.	W12 9.20
Portsmouth,O.	P12 8.90
Roebling,N.J.	R5 9.20
Waukegan,Ill.	A7 8.90
Worcester,Mass.	A7, T6 9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala.	R2 137
Aliquippa,Pa.	J5 141
Atlanta	A11 144
Bartonville,Ill.(19)	K4 144
Crawfordsville,Ind.	M8 146
Donora,Pa.	A7 141
Duluth,Minn.	A7 141
Fairfield,Ala.	T2 141
Houston,Tex.	S5 149
Johnstown,Pa.	B2 141
Joliet,Ill.	A7 141
KansasCity,Mo.	S5 153
Kokomo,Ind.	C16 143
Minnequa,Colo.	C10 147
Monessen,Pa.	P7 146
Pittsburg,Calif.	C11 161
Portsmouth,O.(18)	P12 148
Rankin,Pa.	A7 141
So.Chicago,Ill.	R2 137
So.SanFran.,Calif.	C10 161
SparrowsPoint,Md.	B2 143
Sterling,Ill.(1)	N15 141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala.	R2 123
Atlanta	A11 126
Bartonville,Ill.(19)	K4 123
Crawfordsville,Ind.	M8 132
Donora,Pa.	A7 123
Duluth,Minn.	A7 123
Fairfield,Ala.	T2 123
Joliet,Ill.	A7 123
KansasCity,Mo.	S5 135
Kokomo,Ind.	C16 125
Minnequa,Colo.	C10 128
Pittsburg,Calif.	C11 147
So.Chicago,Ill.	R2 123
So.SanFran.,Calif.	C10 147
SparrowsPoint,Md.	B2 125
Sterling,Ill.(1)	N15 123

WIRE, Upholstery Spring

Aliquippa,Pa.	J5 5.90
Alton,Ill.	L1 6.10
Buffalo	W12 5.90
Cleveland	A7 5.90
Donora,Pa.	A7 5.90
Duluth,Minn.	A7 5.90
Johnstown,Pa.	B2 5.90
LosAngeles	B3 6.85
Monessen,Pa.	P7, P16 5.90
NewHaven,Conn.	A7 6.20
Palmer,Mass.	W12 6.20
Pittsburg,Calif.	C11 6.85
Portsmouth,O.	P12 5.90
Roebling,N.J.	R5 6.20
So.Chicago,Ill.	R2 5.90
So.SanFrancisco	C10 6.85
SparrowsPoint,Md.	B2 6.00
Torrance,Calif.	C11 6.85
Trenton,N.J.	A7 6.20
Waukegan,Ill.	A7 5.90
Worcester,Mass.	A7 6.20

WOVEN FENCE, 9-15½ Ga.

	Col.
AlabamaCity,Ala.	R2 127
Ala.City,Ala.	17-18ga.R2 214
Aliquippa,Pa.	9-14½ga.J5 131
Atlanta	A11 134
Bartonville,Ill.(19)	K4 131
Crawfordsville,Ind.	M8 133
Donora,Pa.	A7 131
Duluth,Minn.	A7 131
Fairfield,Ala.	T2 131
Houston,Tex.	S5 139
Johnstown,Pa.	B2 131
Johnstown,17ga.,6"	B2. 205
Johnstown,17ga.,4"	B2.. 208
Joliet,Ill.	A7 131
KansasCity,Mo.	S5 143
Kokomo,Ind.	C16 133
Minnequa,Colo.	C10 139
Monessen,Pa.	P7 136
Pittsburg,Calif.	C11 154
Portsmouth,O.(18)	P12 138
Rankin,Pa.	A7 131
So.Chicago,Ill.	R2 127
Sterling,Ill.(1)	N15 131

FENCE POSTS

ChicagoHts.,Ill.	C2 140
Duluth,Minn.	A7 125
Franklin,Pa.	F5 140
Huntington,W.Va.	W7 140
Johnstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago,Ill.	R2 140
Tonawanda,N.Y.	B12 140
Williamsport,Pa.	S19 150

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 9.85
Lebanon,Pa.(31)	B2 9.85
Minnequa,Colo.	C10 9.85
Pittsburgh	O3, P14 9.85
Seattle	B3 10.35

NAILS & STAPLES, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala.	R2 118
Aliquippa,Pa.(13)	J5 118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	M8 122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 126
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 130
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 124
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa.	A3 $7.35
Wheeling,W.Va.	10 7.35

TIE PLATES

Fairfield,Ala.	T2 4.50
Gary,Ind.	U5 4.50
Ind.Harbor,Ind.	I-2 4.50
Lackawanna,N.Y.	B2 4.50
Minnequa,Colo.	C10 4.50
Pittsburg,Calif.	C11 4.65
Seattle	B3 4.65
Steelton,Pa.	B2 4.50
Torrance,Calif.	C11 4.65

JOINT BARS

Bessemer,Pa.	U5 4.70
Fairfield,Ala.	T2 4.70
Ind.Harbor,Ind.	I-2 4.70
Joliet,Ill.	U5 4.70
Lackawanna,N.Y.	B2 4.70
Minnequa,Colo.	C10 4.70
Steelton,Pa.	B2 4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1 6.15
KansasCity,Mo.	S5 6.40
Lebanon,Pa.	B2 6.15
Minnequa,Colo.	C10 6.15
Pittsburgh	J5 6.15
Seattle	B3 6.65
So.Chicago,Ill.	R2 6.15
Struthers,O.	Y1 6.15
Youngstown	R2 6.15

AXLES

Ind.Harbor,Ind.	S13 5.60
Johnstown,Pa.	B2 5.60

RAILS	Std. No. 1	Std. No. 2	All No. 2	Std. Tee Rails 60 lb Under
Bessemer,Pa.	U5	3.60	3.50	3.55	4.00
Ensley,Ala.	T2	3.60	3.50	...	4.00
Fairfield,Ala.	T2	...	...	...	4.00
Gary,Ind.	U5	3.60	3.50	3.55	...
Hu ington,W.Va.	W7	...	...	...	5.00
Ind.Harbor,Ind.	I-2	3.60	3.50	3.55	...
Johnstown,Pa.	B2	...	...	...(16)	4.00
Lackawanna,N.Y.	B2	3.60	3.50	..	4.00
Minnequa,Colo.	C10	3.60	3.50	...	4.50
Steelton,Pa.	B2	3.60	3.50	...	...
Williamsport,Pa.	S19	...	...	...	4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 38" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators: to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38)14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

X MARKS THE SPOT

Where *Carpenter* Helps You in Your Work with Stainless

Getting better machined finishes, longer tool life and fewer rejects on Stainless jobs is the answer to—

- **increased production from every shift**
- **more parts from every pound of material**

To make Stainless Steel do its best for you, take advantage of the help Carpenter can provide. We'll be glad to give you personal help in the shop and useful printed information that makes it easier to work with Stainless.

The new Carpenter Stainless Slide Chart quickly gives you information your men need to know. It gives the relative workability for many grades, useful information for jobs where you do *blanking*, *deep drawing*, *forging*, *heading*, *machining*, *welding*, etc. You will also find a complete table of information on the physicals for the Stainless grades. Just drop us a note, on your company letterhead indicating your title, and we will put your Carpenter Stainless Slide Chart in the mail for you.

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Department: The Carpenter Steel Company, Reading, Pa., "CARSTEELCO"

DON'T WAIT... COOPERATE!
The U.S. Needs Your Steel Scrap, Now

Carpenter
STAINLESS STEEL
takes the problems out of production

For Help on Stainless Jobs Call Carpenter! Warehouses in principal cities throughout the country.

STANDARD PIPE, T. & C.

BUTTWELT Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½% on 3½", 4"; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ⅛" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1¼", 2", 1½ points lower on 1¼", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1". 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Strip—Cold-Rolled Carbon Base 10%	Strip—Cold-Rolled Carbon Base Both Sides	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Cu Base Both Sides
302 ...	....	....	....	....	19.75	26.24-27.50	77.00
304 ...	25.00	29.50	....	....	24.50	27.50-27.77	77.00
309 ...	30.50	35.00	....	....	....	....	....
310 ...	36.50	41.00	....	....	....	....	144.00
316 ...	29.50	34.00	....	....	26.00	35.92-36.50	....
317 ...	34.50	39.00	....	....	....	....	....
318 ...	33.50	38.00	....	....	....	....	....
321 ...	26.50	31.00-32.00	....	....	23.00	33.00	111.00
347 ...	27.50	32.00	....	....	24.00	33.50-33.83	130.00
406 ...	21.25	27.75	....	....	....	....	....
410 ...	20.75	27.25	....	....	....	....	....
Nickel.	33.55	45.15	41.00	54.00	....	....	....
Inconel.	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless paltes, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in	18.5
⅞-in. and larger ..	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter ...	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up Bolts	31

NUTS

	Reg. Hvy.
H.P. & C.P. Square:	
½-in. & smaller	15 15
⅝-in. & ¾-in..	12 6.5
⅞-in.-1⅛-in. ..	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in..	16.5 6.5
⅞-in.-1⅛-in. ..	12 2
1⅛-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in..	23 17.5
⅞-in. & 1⅛-in.	19.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg. Hvy.
½-in. & smaller..	35 28.5
⅝-in. & ¾-in. ..	29.5 22
⅞-in.-1⅛in.	24 15
1⅛-in. & larger .	13 8.5
	Light
½-in. & smaller	35
⅝-in. to ¾-in.	28.5
⅞-in. to 1⅛-in.	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish .....48 & 10	
Plated finishes .... 31 & 10	

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
½-in. & smaller	42
¾-in. through 1 in. .	34
Longer than 6 in.:	
½-in. & smaller ...	28
¾-in. through 1 in. .	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged: per cent off list)

No. 10 and smaller....	35
¼-in. diam. & larger..	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers...List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Bait., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg..26.00-33.00

Industrial xylol..25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia..$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron 98+% Fe, carlots..	17.00
Swedish, c.l.f. New York, in bags.	.8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	.83.00-143.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	32.50
Antimony	75.85
Brass, 20-ton lots.	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	33.75
Lead	26.30
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh ..	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed ..	86.00
Nickel-Silver 5-ton lots	45.00
Silicon	38.50
Solder (plus cost of.. metal)	8.50
Stainless Steel, 302 ..	83.00
Zinc, 10-ton lots.	25.00-32.50
Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh:	
1000 lb and over ..	6.90
Less than 1000 lb..	6.15
98.8% minus 65 mesh:	
1000 lb and over ..	4.15
Less than 1000 lb..	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min.	8.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fur.	$14.50-15.00
Connelsvil,fdy.	..17.00-18.00
New River foundry	..21.30
Wise county, foundry	..15.95
Wise county, furnace	..15.30

OVEN FOUNDRY COKE

Kearny, N. J. ovens.	.$32.75
Everett, Mass., Ovens New England, del.	*24.80
Chicago ovens	23.00
Chicago, del.	24.50
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	24.42
Cincinnati, del.	25.85
Detroit, del.	26.85
Ironton, O., ovens	22.50
Cincinnati, del	25.13
Painesville, O., ovens	24.00
Cleveland, del	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.60
Philadelphia, ovens	22.70
Nevillelsland.Pa.,ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.89
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

stalled for special steels?

When you get caught in a predicament like this, your best way out is to call your nearest Crucible Warehouse!

For—we are glad to say—our stocks of specialty steels are good—and especially tool steels!

Furthermore, calling Crucible usually assures faster delivery because one of our warehouses is located within convenient delivery distance of your plant.

So next time you are in danger of stalling, call us *first!*

Stocks maintained of:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Max-el Machinery, Onyx Spring and Special Purpose Steels.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking **WAREHOUSE SERVICE**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND DENVER • DETROIT • HOUSTON • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH PROVIDENCE • ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • ST. PAUL • SYRACUSE • TORONTO, ONT. • WASHINGTON, D.C.

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡§		Carbon	Floor
New York (city)	6.37	7.21	8.55	7.05	...	6.59	7.53	9.28	6.34	6.71	7.98
JerseyCty(c'try)	6.07	6.91	8.25	6.75	..	6.29	7.23	8.98	6.04	6.41	7.68
Boston (city) ..	6.40	7.18	8.55	6.35	...	6.25	7.04	9.00	6.40	6.55	7.84
Boston (c'try)..	6.20	6.98	8.35	6.15	...	6.05	6.84	9.20	6.20	6.35	7.64
Phila. (city) ..	6.04	6.97	8.35	6.33	7.11	6.27	7.16	8.97	6.00	6.30	7.29
Phila. (c'try) ..	5.79	6.72	8.10	6.08	6.86	6.02	6.91	8.72	5.84	6.05	7.04
Balt. (city) ..	5.74	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.57
Balt. (c'try) ..	5.54	6.80	8.20	6.03	...	6.01	6.63	..	6.13	6.13	7.37
Norfolk, Va. ..	6.78	...	...	...	...	6.04	7.30	...	6.30	6.30	7.15
Richmond, Va.	5.74	6.57	8.38	6.14	...	5.91	6.59	...	6.72	6.86	8.00
Wash. (w'hse) .	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)..	5.74	6.52	8.29	6.06	...	5.80	6.65	10.65††	6.00	6.23	7.55
Buffalo (w'hse)	5.54	6.32	8.09	5.86	...	5.60	6.45	10.45††	5.80	6.03	7.35
Pitts. (w'hse)..	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse).	5.75	6.47	8.12	5.76	7.15	5.76	6.64	9.13	6.09	5.88	7.21
Cleveland (del.)	5.85	6.52	8.16	5.85	7.18	5.76	6.60	8.91	6.15	6.07	7.40
Cleve. (w'hse) .	5.65	6.32	7.96	5.65	6.98	5.56	6.40	8.71	5.95	5.87	7.20
Cincin. (city ..	5.99	6.53	8.44	5.92	...	5.90	6.79	...	6.21	6.29	7.43
Chicago (city).	5.77	6.54	8.08	5.70	...	5.67	6.50	10.47††	5.85	5.92	7.09
Chicago (w'hse)	5.57	6.34	7.88	5.50	...	5.47	6.30	10.27††	5.65	5.72	6.89
Milwau. (city).	5.90	...	8.21	5.85	...	5.83	6.81	10.46††	6.01	6.06	7.26
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.61	10.26††	5.81	5.86	7.06
St. Louis (del.)	6.02	6.85	8.20	6.00	...	5.95	6.85	10.55	6.22	6.27	7.48
St. L. (w'hse).	5.82	6.65	8.00	5.80	...	5.75	6.65	10.35	6.02	6.07	7.28
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.Cty(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90[3]	5.70	...	5.70	7.53	...	5.85	6.10	8.26
Birm'hm(w'hse)	5.60	6.40	6.75[3]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30[3]	9.55	6.60	10.65	6.45	8.35	...	6.50	6.50	8.75
L. A. (w'hse)..	6.30	8.10[3]	9.35	6.40	10.45	6.25	8.15	...	6.30	6.30	8.55
Seattle-Tacoma	7.04	8.64	9.25	7.04	...	6.70	8.80	10.35	6.54	6.78	8.73
San Francisco..	6.62	7.88[3]	9.10[3]	6.58	...	6.45	8.20	11.15	6.45	6.37	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gage; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [3]—500 to 1499 lb; [4]—450 to 1499 lb; [5]—3500 lb and over; [6]—1000 to 1999 lb

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del., E. Pa.

Foundry and basic 56-62% concentrates contract	17.0¢

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	$20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	30.00-31.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00
South African Transvaal	
44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	nom.
Rhodesian	
45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr. c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%,) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr. C.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 21.75c per lb or contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

Note: Current prices on zirconium, calcium and briquetted alloys appeared on page 157, Feb. 11 issue; manganese, titanium and "other" ferroalloys, page 177, Feb. 18. Refractories prices were published on page 157, Feb. 11.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c, Delivered. Spot, add 0.25c.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy; ton lots packed 11.30c, 200 to 1999 lb 11.60c; smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained V. Delivered, Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3.20. **Primes and High Speed Grades** (V 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si, 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%). 10,000 lb W or more, $5.00 per lb of contained W; 20,000 lb W to 10,000 lb W, $5.10; less than 2000 lb W, $5.22.

Tungsten Powder: Carbon Reduced; (W 98.8% min.) 1000 lb or more, $6.00 per lb of contained W; less than 1000 lb W, $6.15.

*Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952.

STEELMAKING SCRAP COMPOSITE

Feb. 21	$43.00
Feb. 14	43.00
Jan. 1952	43.00
Feb. 1951	44.00
Feb. 1947	33.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	Grade 1 No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades	
2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings and Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00
Elec. Furnace and Fdry. Grades	
11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
31. Old Tin & Terne Plated Bundles	—10.00
Unprepared Grades	
When compressed constitutes:	
32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or/steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses, otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.
(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O. 51c.
Warren, Pa., 75c; Weirton, 70c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

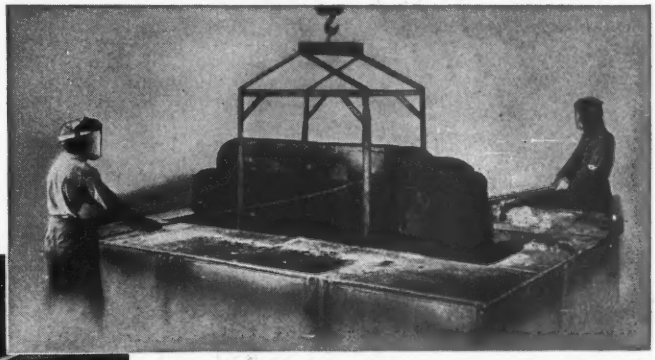
Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory: Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

You can clean work of any size with the Du Pont

SODIUM HYDRIDE DESCALING PROCESS

FROM HEAVY STEEL PLATES...



Scale is quickly and thoroughly removed from steel plates by the sodium hydride descaling process. Economies of this process include savings in time, equipment and acid.

...TO SMALL CLOSURE BUTTONS

Precision fasteners are descaled without change in dimensional accuracy. There is no loss of base metal during hydride descaling because bath action stops when the scale has been reduced.

• • •

Technical assistance with your metal descaling program can be obtained by writing or calling our nearest office.

DISTRICT AND SALES OFFICES

BALTIMORE	DETROIT
BOSTON	KANSAS CITY*
CHARLOTTE	LOS ANGELES
CHICAGO	NEW YORK
CINCINNATI	PHILADELPHIA
CLEVELAND	PITTSBURGH

SAN FRANCISCO

*Barada & Page, Inc.

SCALE can be removed from work of any size or shape quickly, economically and thoroughly with this modern descaling process. Installations now in operation are cleaning all types of finished articles and processed stock *—from intricate parts weighing only a fraction of an ounce to large steel plates of over 3 tons!*

The hydride descaling process is basically simple and easy to operate. Parts to be descaled are immersed in a molten caustic soda bath containing small amounts of sodium hydride. There is no loss of base metal during the cleaning cycle because the bath action stops when the scale has been reduced. Alloy steels, stainless steels, nickel, copper, titanium and cobalt bearing alloys can be handled with equal effectiveness—even in the same bath. And users of the process find that hydride descaling is bringing new economy to the metal cleaning field—in faster cleaning operations with low equipment capital investment, reduced floor space requirements and reduced acid consumption.

Why not find out for yourself how the Du Pont Sodium Hydride Descaling Process can help you solve your metal cleaning problems. For full information, contact our nearest district or sales office or send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

Please send me detailed information on the Du Pont Hydride Descaling Process: advantages, applications, equipment used. I am interested in cleaning_____products.

*Name*_____ *Position*_____

*Firm*_____

*Street and No.*_____

*City*_____ *State*_____

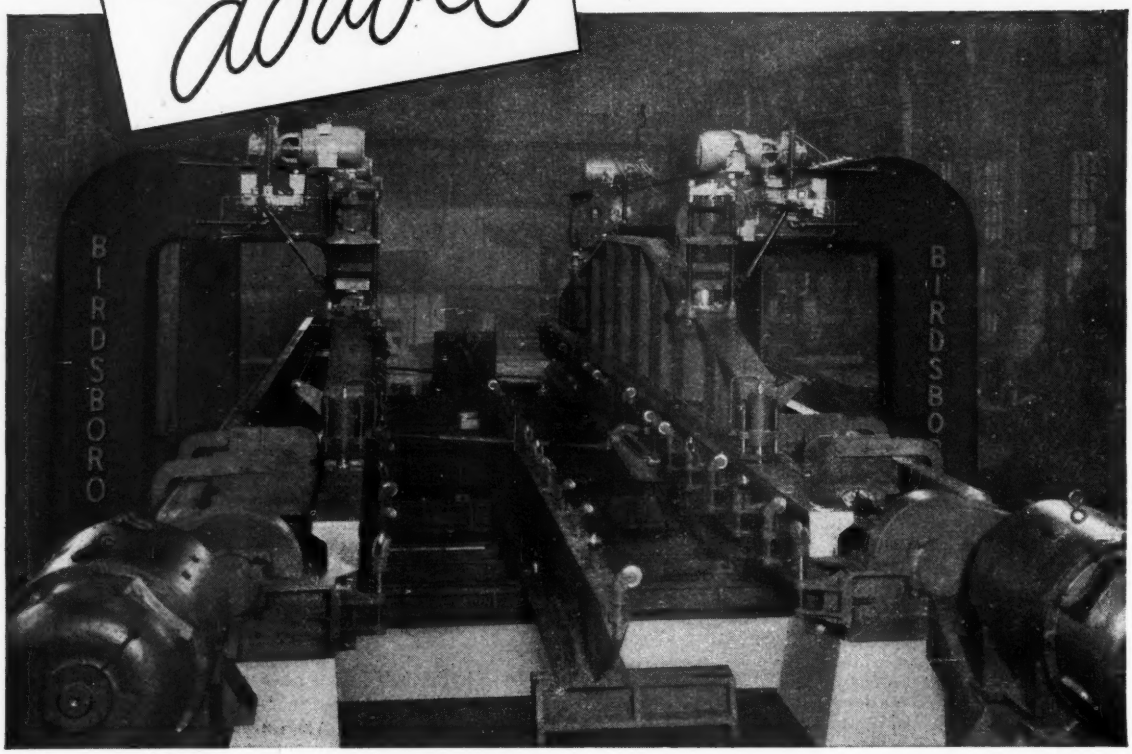
DU PONT
Sodium hydride process for positive descaling

DU PONT REG. U.S. PAT. OFF.

150th Anniversary

BETTER THINGS FOR BETTER LIVING . THROUGH CHEMISTRY

DOUBLE double YOUR PRODUCTION...



with this Birdsboro Plate Planer

Two edges are planed in one pass with one setup at speeds up to 100 ft. per min. This is a time-saving advantage over most other machines which require two passes to machine a plate edge.

Such increased production is essential to speed the production of welded pipe and the laying of pipe lines so necessary in our defense effort.

This Birdsboro Plate Planer is equipped with a mechanical centering device which guides the plates over the casters. A self-contained hydraulic system locks the plates in place under heavy hold-down beams.

If you are considering installing any type of steel mill machinery, it will pay you to enlist the services of Birdsboro engineers.

BIRDSBORO
STEEL FOUNDRY & MACHINE CO.
Birdsboro, Penna.

Offices in BIRDSBORO, PA. AND PITTSBURGH, PA.

STEEL MILL MACHINERY

Designers and Builders of:
Steel Mill Machinery • Crushing Machinery • Rolls
Hydraulic Presses • Special Machinery • Steel Castings

MM-23-52

Expenditure of $2 billion by end of 1955 will boost domestic mine output of copper by 225,000 tons, of zinc by 230,000 tons and of lead by 36,000 tons

EXPANSION in domestic mining operations will cost in excess of $2 billion by the end of 1955. This increase in production of ores is necessary to obtain adequate tonnages of metals and minerals needed by the steel industry, nonferrous smelters and other consumers.

Of the three leading nonferrous metals, annual capacity by 1955 will be increased by 225,000 tons for copper, 230,000 tons for zinc and 36,000 tons for lead. This program was revealed by James K. Richardson, Utah Copper Division, before the American Institute of Mining & Metallurgical Engineers, New York.

Outlook Brightens—Although there still is a shortage of copper, the outlook is rapidly becoming more favorable, says James T. Duffy Jr., president, Riverside Metal Co., Riverside, N. J. He points out that nine major copper mining projects are scheduled for development in the United States and others are planned in six principal copper producing areas throughout the world. These should add about 600,000 to 700,000 tons a year to the available copper supply, he says.

Mr. Duffy also calls for "an end to the misuse of copper in nonessential production abroad, a program of planned conservation in processing in this country, industry co-operation in a copper scrap collection drive, and increased government co-operation with the copper industry to develop new sources of supply as rapidly as possible."

Expansion Plans — To bolster its copper supply, Anaconda Copper Mining Co. is developing an ore body at Yerington, Nev., at a cost of $38 million which in a few years will produce about 30,000 tons annually the first two years; 33,000 tons thereafter. Greater Butte project, costing $27 million, will start production in a few months at an annual rate of 20,000 tons of copper. This will be stepped up eventually to a 45,000 ton rate. The company is changing over operations at its Chile Copper Co. properties to mine the sulphide ore bodies. This changeover, plus the Greater Butte project, will add a total of 95,000 tons to productive capacity this year.

Calumet & Hecla Consolidated Copper Co. proposed to Defense Materials Procurement Agency that two more of its mines be reopened. These mines are high-cost properties and contain large amounts of copper. The company now is operating seven high-cost mines in northern Michigan. The government recently granted subsidies of 5 to 6 cents a pound over the ceiling on lake copper which covers four of Calumet's highest cost mines. The subsidy was granted to prevent closedown of these properties and affects output of about 500 tons a month.

Phelps Dodge Corp. is developing its East Bisbee, Ariz., ore body at an estimated cost of $25 million to produce 38,000 tons of copper a year, starting late in 1954.

A. S. & R.—American Smelting & Refining Co. is developing its Silver Bell Arizona copper ore body at a cost of $17 million. This property is expected to turn out 18,100 tons of copper annually when ready a few years from now. The company is considering development of one of its two large ore bodies in Peru, but this will require up to six years.

Magma Copper Co. is negotiating an RFC loan for further development of its San Manuel Copper Co. ore body in Arizona. About $10 million have been spent since development was started in 1944. It is estimated an additional $85 million will be required to initiate production of 70,000 tons of copper annually about four years from now. Magma also is developing the ore body of its wholly-owned subsidiary, Copper Cities Mining Co., for production a few years from now. The cost is estimated at $15 million. This ore body will replace the Castle Dome mine and, consequently, will not add to total production.

Supply Remains Tight—These programs will provide larger tonnages in late 1953. No immediate improvement in the copper supply situation can be anticipated; indications are that the supply will not increase materially in March. Factors primarily responsible for this situation include the gradual absorption of the supply of concentrates accumulated as a result of the work stoppage during the summer of 1951, and a continuing shortage of refinery grade scrap. Total supply was estimated by NPA at 120,000 tons in January and 106,000 tons in February.

More Titanium Available

More titanium is available for domestic consumption. Titanium Pigment Corp., subsidiary of National Lead Co., is discontinuing allocations of all types of titanium dioxide pigments because of an improved supply. The firm is ready to accept additional orders for both pure and calcium-base pigments.

Increased supplies have resulted from plant expansion under way since the end of World War II. Increased production of titanium dioxide has been attained in spite of serious material shortages, especially in sulphur, by conservation and economy measures in the firm's plants in St. Louis and Sayreville, N. J.

Quebec Iron & Titanium Co. will become an important supplier of titanium. This company is owned by Kennecott Copper Corp. and New Jersey Zinc Co. It is developing a high-grade titanium-bearing ore body, estimated to have several hundred million tons of ore. The present goal is erection of five furnaces to smelt the ore. One is already producing and another has been completed for early production. Eventually the five furnaces will turn out about 225,000 tons of slag, containing about 70 per cent titanium oxide. The company is experimenting to obtain a commercial method for making titanium metal.

Lead, Zinc Supply Gains

Supply outlook in lead and zinc continues to improve. The government purchased 30,000 tons of lead from the Ministry of Materials, London, for delivery in the next four months at a price equivalent to the current ceiling for foreign lead in the United States. An important segment of the domestic industry objects strenuously to this transaction on the basis that it represents an "expansion of planned economy from a domestic to an international level. . . . The sooner lead and zinc are decontrolled . . the better it will be for the consumers as well as the producers."

Vast new zinc ore deposits have been discovered southeast of Jefferson City, Tenn., by American Zinc Co. The deposit contains an estimated 100 million tons of zinc concentrates, or more new zinc than has been discovered in all the rest of the United States in 39 years, says the Geological Survey.

Copper Deliveries Soar

Deliveries of copper to fabricators soared to a 5-year high in January, amounting to 130,430 tons, including shipments from government stockpile. Since production of refined copper amounted to only 100,269 tons, stocks held by members of the Copper Institute declined 10,692 tons to 60,836. These stocks include tonnages delivered to United States consumers at foreign ports. Production from primary sources declined to 79,746 tons from 82,695 tons in December, while output from scrap eased to 3462 tons from 3985 tons.

Aluminum Output Increases

Primary production of aluminum in December totaled 144,907,819 pounds, bringing the 1951 total to 1,673,815,406 pounds, or an increase of 16.5 per cent over the previous year's figure. Shipments of sheets and plate by member companies of the Aluminum Association totaled 1,076,226,278 pounds in 1951 compared with 1,155,318,982 pounds in 1950. Aluminum foil shipped during the year amounted to 94,246,269 pounds compared with 90,679,719 pounds in 1950. Shipments of permanent-mold and semipermanent-mold rough castings (except pistons) came to 33,697,136 pounds, or slightly under those of 34,336,366 pounds in 1950.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c. East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $203-$207 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy f.o.b Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass, 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 28.545; 30,000 lb lots, 28.67; l.c.l., 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.60; l.c.l., 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	..	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R-317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.6c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zinc bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00, Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

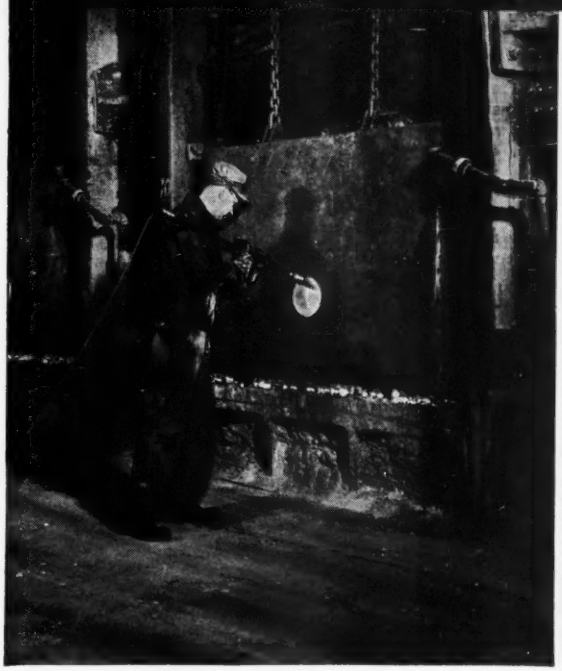
DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Feb. 1-21	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
Jan. 22-31	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. 2-21	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis, Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk f.o.b. Laredo Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver open market, New York. Prices, cents per pound; except silver, cents per ounce.

FOR MORE INGOT TONNAGE PER HEAT

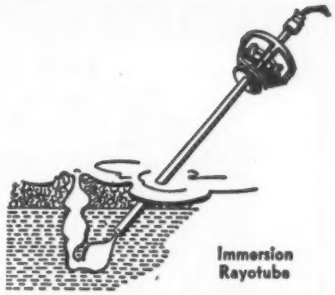
Measure Temperatures By Immersion Thermocouple or Immersion Rayotube



OPEN HEARTH and electric furnace shops can now choose between two tested L&N methods for measuring steel temperatures during the melt. Either an Immersion Rayotube or an Immersion Thermocouple is plunged momentarily beneath the surface to measure the temperature of the bath, while a dependable Speedomax Recorder displays the information where all concerned can use it.

Either method helps improve ingot production by warning if the steel is too hot or too cold for tapping. Recently published talks before national steel associations indicate that production losses have been sharply cut in plants where temperature is properly measured while the melt is finished off for tapping.

It pays to select your immersion-measuring equipment from a source which makes both radiation and thermocouple types. The two equipments cost about the same initially; among the factors which should be weighed without prejudice are: size and type of furnace, type and quality of steel, experience of helpers in using instruments, supervisory set-up and the differences in maintenance supplies and labor. If you'll contact our nearest office, or 4957 Stenton Ave., Philadelphia 44, Pa., we'll be glad to supply such other information as you desire.



Immersion Rayotube

Rayotube gets its reading inside a bubble blown by compressed air or other gas, while Thermocouple contacts the metal directly. Both methods give the "heart" temperature of the molten steel, and give it in time for any changes necessary before tapping.

Immersion Thermocouple

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Jrl. Ad. ND46-33B-0661(1)

ARDCOR TUBING ROLLS

★ These Tubing Rolls, made of ARDCORLOY*—a special alloy steel, were designed and manufactured by ARDCOR for one of America's leading Welded Tube Manufacturers (name on request).
* PRODUCTION PROVEN—30% more footage!

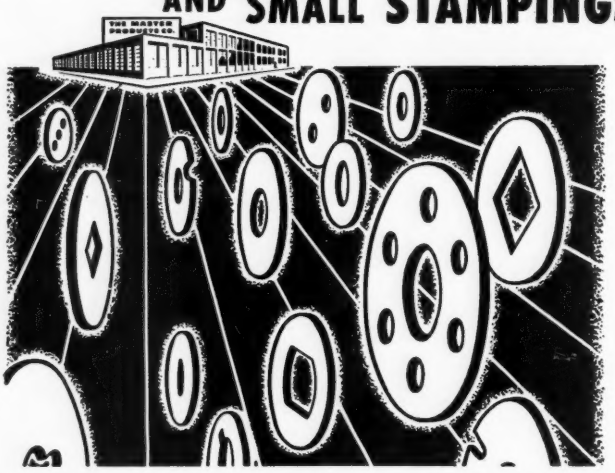
What are YOUR Roll Forming Requirements?

ARDCOR SPECIALTIES

ARDCORLOY ROLLER DIES • ROLL FORMING MACHINERY • CUT-OFF MACHINES

American ROLLER DIE CORPORATION
20700 St. Clair Avenue • Cleveland 17, Ohio

STANDARD AND SPECIAL WASHERS AND SMALL STAMPINGS



More than 30 years of experience in designing and producing Special Washers and Small Stampings . . . more than 12,000 sets of tools at your disposal. Any metal . . . any quantity. *Your inquiries will receive prompt and careful attention.*

THE MASTER PRODUCTS CO.
6400 Park Avenue Cleveland 5, Ohio

Steel Bars . . .

Bar Prices, Page 135

Boston—Second quarter openings in rolling schedules have been tightened by a substantial increase in defense demand for carbon steel bars, 2-in. and under. Cold-rolled converters are taking full allotments and are sold into June on medium sizes. Carbon bars are sold ahead of most alloys, electric furnace grades and bessemer.

New York—Bars top all major carbon products in point of demand. Large sizes, especially 3-in. and up, are under heaviest pressure but there is scarcely a size or shape that isn't in strong demand. Sellers will have a substantial carryover at end of this quarter.

Philadelphia—While most carbon bar consumers have been advised by Washington of their second quarter allotments, some are still in the dark.

Pittsburgh—Carbon bar supply remains tight in this area. Forging, cold-finished and hot-topped quality material are hardest to obtain from local mills. Smaller sizes are easier to pick up where grade is of not too much importance. Defense requirements continue strong.

Cleveland—Bar sellers are heavily booked through second quarter and as yet there is no indication of any softening in demand, such as is reported in the light, flat-rolled products. Defense requirements, notably on military account, still are increasing.

Sheets, Strip . . .

Sheet and Strip Prices, Page 135 & 136

Cleveland—Slack in consumer durable goods as result of arbitrary cuts in steel and other raw material allotments by government controllers is reflected increasingly in the easing in pressure on the mills for the light, flat-rolled products. The easing is chiefly noticeable in cold-rolled, enameling and silicon grades. Some of the mills have been having difficulty disposing of rejects but on prime material they are booked up, as a general thing, through second quarter. So far they have had relatively little difficulty in filling open spaces in their rolling schedules. The warehouses are getting substantially larger shipments of sheets with the result distributors' stocks are increasing steadily.

Boston—More carbon and coated tonnage is offered with better shipment and service. More producers again are selling instead of just taking orders selectively, girding for future competition by building up good will with customers. Conjecture centers on what is coming with production at Morrisville, Pa. Consumers look for a break in their favor, price-wise and in service.

New York—Some sheet producers are accepting orders for third quarter on some of the slower moving specialties, such as straight chrome steels, low silicon steels and enameling stock. While there is some easing in the major grades also, cold-rolled sheets and strip in particular, there appears no disposition to accept tonnage for third quarter as yet.

Philadelphia—Despite easing in demand, sheet producers are having

little difficulty in disposing of tonnage. There are a few order cancellations and some shipment deferments, but these gaps, it appears, are quickly filled.

Pittsburgh — Despite heavy mill bookings for remainder of the second quarter, easing in some of the flat-rolled products continues. Cold-rolled material is easiest to obtain followed by hot-rolled and long ternes which are slightly tighter than a few weeks back. This increased demand for ternes is attributed to completion of recent inventory adjustments at customers' plants.

Chicago—Because more steel is consumed in this area than is produced here, and because consumption is highly diversified, the easing in cold-rolled sheet and strip supply is not observed so markedly here as in other areas.

St. Louis—Cancellations for cold-rolled sheets continue to come in, but in less volume than expected. Producers here oversold capacity by 20 per cent the first quarter, hence demand pressure is not off, even with the cancellations. Some orders have been taken into third quarter.

Los Angeles—CPR 98 has helped to divert tonnage back into normal channels of distribution. Fabricators say contact from gray-market sellers has dried to the vanishing point.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Boston—Distributors hold better supplies of buttweld merchant steel pipe in smaller sizes. In some cases pipe is being sold at a higher discount to users. Most jobbers are reluctant to pass up established mill allocations, but they are moving tonnage less freely. Light welded tubing demand, carbon and alloy, does not support full production with most producers.

Plates . . .

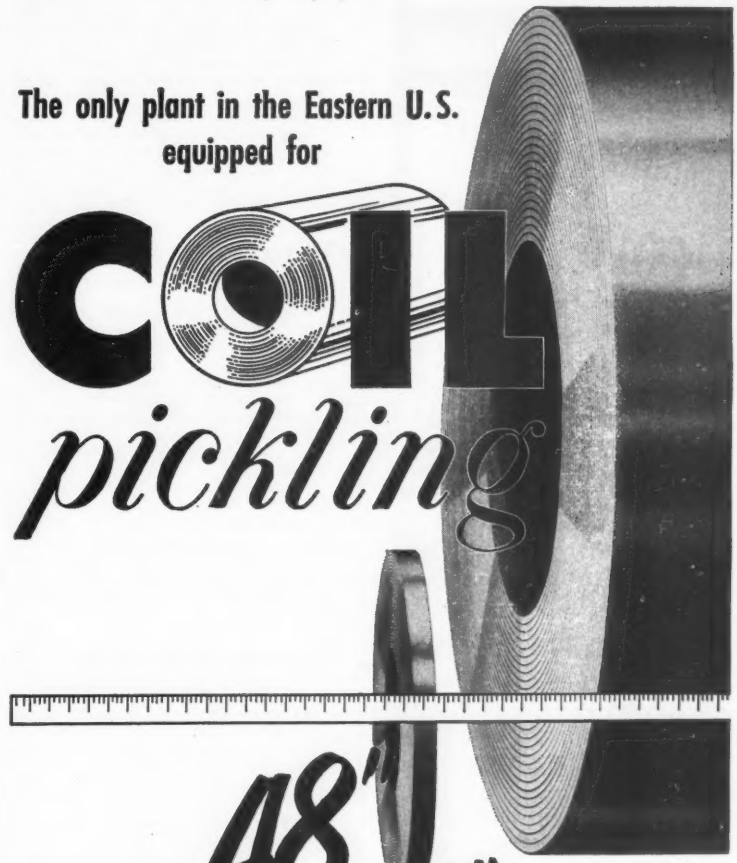
Plate Prices, Page 135

Philadelphia—While there is an active demand for all thicknesses of plates, the particular pressure is still on the heavier gages for pressure vessels, boilers and various military needs. Recently, district mills have been given special directives for the March rolling of plate, including ship plates. This, of course, will increase the first quarter carryover. The Coatesville, Pa., producer will curtail production in April for necessary repairs. The plan now calls for suspension of operations on the 112-in. mill for four weeks and on the 120-in. mill for two weeks.

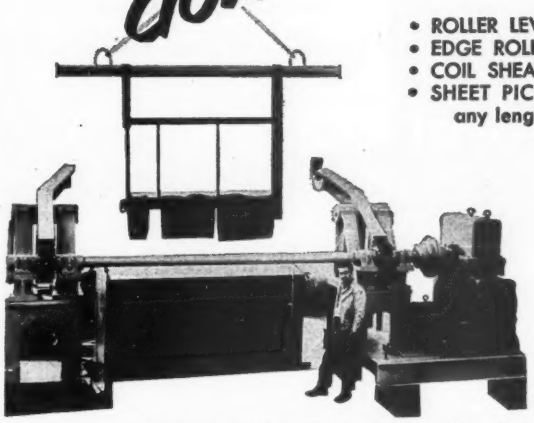
Pittsburgh—Plates are in heavy demand. Mills see no let-up for months to come.

Boston—With fabricating shops estimating and booking more orders, improvement in available light gage plate tonnage is timely. Heavier sizes are sold well ahead and producers are unable to improve volume, notably quality hot-topped grades.

New York—Plate sellers note no appreciable easing in demand for the light gages. There is a better supply of tonnage from the strip mills, but seasonal improvement in demand from fabricators of fuel oil storage tank and household water heaters is



- ROLLER LEVELLING
- EDGE ROLLING • SLITTING
- COIL SHEARING
- SHEET PICKLING—any width, any length, any thickness



Write for Detailed information folder

MARSAM CORPORATION
Subsidiary: AMERICAN TOOL & SUPPLY CO.

OFFICE: FRICK BUILDING, PITTSBURGH 22, PA. PLANT: McKEES ROCKS, PA.

National Metal

LEADING SPECIALISTS IN

COLD ROLL FORMING

SINCE 1902

Announce

THE AVAILABILITY OF A PORTION OF OUR MODERN FACILITIES FOR D.O. PRODUCTION

Our broad metal forming experience covers shapes that can be fabricated by Cold Rolling steel, bronze, aluminum, stainless steel.

Comprehensive statement of our available capacity at your request. With requests for specific quotdtions, please include your blue print.

National Metal
PRODUCTS CO.
1025 CHATEAU ST.
PITTSBURGH 33, PA.

NATIONAL METAL PRODUCTS COMPANY

Since 1902 Since 1902

Manufacturers of

• Zinc and Bronze Weatherstripping • Stampings • Metal Frame Screens • Special Rolled Mouldings • Bronze and Aluminum Thresholds • Aluminum Awnings • Window Guard Units for Mobile Machine Shop • Zinc Products • Quonset Hut Window Units • Industrial Polishing.

tending to offset the increased production of strip plate.

Birmingham—Plate demand continues heavy. The product is not being produced in sufficient tonnage to take care of requirements.

Seattle—Larger plate fabricators are figuring the Chief Joseph dam job. Bids will be taken by the U. S. Engineer, Seattle, Mar. 12, involving an estimated 8000 tons of plates.

Wire . . .

Wire Prices, Page 137

Boston—Second quarter wire mill schedules will be more unbalanced, reflecting spotty demand with some soft spots, partly due to slow recovery in consumer durable goods and assembly restrictions on others. Automotive and bed spring demand is off with inventories relatively high compared with current production schedules.

St. Louis—One of the largest recent inquiries for nails, Corps of Engineers, St. Louis district, includes 2335 tons, cement coated box, cement coated and plain wire nails. The same office closes Feb. 26 on 1,940,000 linear feet of galvanized steel cloth.

Structural Shapes . . .

Structural Shape Prices, Page 135

Chicago—While structural shapes are scarce, fabricators are concerned about operations after second quarter. Balance between demand and production of shapes is approaching and there is much fear lest NPA will not give approval for building and other construction in time for material to be booked and delivered so that shop facilities can be kept engaged.

Boston—Re-bid and additional sections, 25,000 tons, Boston Arterial highway, are being estimated, closing within the next few weeks. One rejected section, 12,000 tons, will be broken into three steel contracts of 4000 tons each. Bethlehem Steel Co., Bethlehem, Pa., was originally low.

New York—Although fabricating shops have enough business on hand to sustain high-level operations over the next few months, they are concerned over prospects beyond that period. Orders are spotty. Backlogs are tapering. Where work carries definite assurance of government approval, bidding is sharp, something fabricators do not regard as healthy. In some cases, fabricators are making bids that leave them with little or no profit.

Philadelphia—Structural steel demand lags. Government-approved work is not beginning to take up the slack occasioned by restrictions on various types of projects regarded by Washington as not essential to the defense economy.

Pittsburgh—District mills see the current structural steel supply situation easing to the point where they will be out seeking business in a few months unless the government approves new building programs.

Seattle—Largest pending project here involves 3000 tons for Boeing Airplane Co. hangars. Bids are in, American Bridge Co. apparently being low. Several smaller awards are pending. Plants are booked 90 days ahead.

Semifinished Steel . . .

Semifinished Prices, Page 135

Pittsburgh—Steelmaking rate here dropped one point to 100.5 per cent of capacity from the previous week's revised rate of 101.5 per cent. The Wheeling rate was up one point to 100 per cent. The Pittsburgh operating rate reflects lowered production at Allegheny Ludlum Steel Corp. which has an open hearth down for repair and Pittsburgh Steel Co. which is easing back into production due to changeover to a new blooming mill at its Monessen, Pa., plant. Jones & Laughlin set new production records during January, exceeding the best month in 1951 by 10,000 tons. Seven of its 11 new open-hearth furnaces are in production with the remainder expected to come in during the next three to four months.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 135

Los Angeles — With competition more intense for priority construction jobs, prices for deformed bars in place range from 8½ to 12 cents per lb, 2 cents lower than previously.

Seattle—Small tonnages that fit into rolling schedules are being accepted by the mills but no large orders have been placed recently. Backlogs are declining and deliveries are being speeded up.

Pig Iron . . .

Pig Iron Prices, Page 134

Cleveland—While demand pressure for merchant pig iron has abated, chiefly because of the slower operating pace of jobbing foundries, there is no surplus iron in this area. The furnaces are not piling material, having an outlet for every pound produced. Where customers' requirements have declined, the released tonnage is readily placed with the heavy and medium foundries which are going full tilt on defense and related work. The need for basic iron by nonintegrated mills to offset the scrap shortage precludes the possibility of any early change in the overall pig iron supply situation. Should foundry requirements shrivel to the point iron would have to seek takers the furnaces would quickly shift from production of foundry and malleable grades to basic iron. So far this has not been possible. Last week it was reported government warning had gone out to certain foundries in this area about observing inventory limitation regulations. Some shops, it appears, are carrying in excess of 30-days' pig iron stocks.

Buffalo—Survey reveals that a large number of foundries in this area have been forced to curtail melting operations because of the lag in government contracts. Nevertheless, the chief merchant iron producer reports no trouble disposing of its output.

Boston—With small operating inventory, the bulk of iron production of the Mystic blast furnace is going into current foundry melts, enabling most shops to maintain reserves near

regulatory limits. Ratio of iron in melt is held at satisfactory level. Consumption of malleable is slightly ahead of No. 2 foundry. Most users depending on Buffalo production for silvery iron are short of that grade.

Chicago—Except for gray iron foundries engaged heavily in defense and defense-support work, concern is growing over future business levels. Jobbing shops feel limitation orders on civilian goods must be eased drastically and promptly if volume isn't to suffer further.

St. Louis—Pig iron inventories among major consumers are spotty, but none are at the distress point. Granite City Steel's two blast furnaces, the district's principal supplier, in January shipped January and February quotas in anticipation of a repair job on one furnace, cutting off output of slack-demand foundry iron in order to do so.

Birmingham—Pig iron supplies are inadequate although one merchant melter reports some easing in demand pressure, evidently due to a slowing down in foundry activities.

San Francisco — Pig iron supply conditions are improved, largely because of the greater availability of cast iron scrap. Overall supply, however, still is not equal to demand.

Tin Plate . . .

Tin Plate Prices, Page 136

Pittsburgh — Current softening in the tin plate market is primarily due to governmental restrictions on the product's end-uses and readjustment of consumers' inventories for March and April. Mills are attempting to keep their order books filled but it looks like the easing will continue throughout the present quarter. Spokesmen think the bottom has been reached and some improvement can be expected in coming months.

Manganese Ore . . .

New York—Low-cost bulk mining and processing, permitting economic recovery from lower grade ores, loom large in expansion programs, including manganese. For steelmaking, the United States currently imports about two-thirds of its manganese requirements. Several processes for extraction of manganese from low-grade ores are making progress.

A plant with large capacity will be required to produce metallurgical grade manganese oxide at a cost to compete with high-grade foreign ores. For treating Cuyuna ores by this process, a commercial plant is under construction at Crosby, Minn., by Manganese Chemicals Co.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 139

Washington—Production of coke by slot-type and beehive ovens reached the new all-time high of 79,123,000 tons in 1951. It is expected output will total in excess of 81 million tons in 1952, according to the Department of the Interior. In 1951, coke output showed an increase of 6,405,000 tons, or about 9 per cent, over the 1950 production.

Gains in coke capacity during the year totaled only slightly over 1 million tons, the increase in output

perhaps our experience can

STRETCH

your alloy steel supplies!

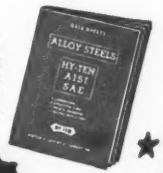
You have doubtless heard about "bar-stretchers." Have you ever seen one? Wheelock, Lovejoy has several — any one of which can help you stretch your alloy steel supply so that you can keep up your production schedules during this period of unavoidable shortages. Having been in the steel business for over 100 years, our staff of metallurgists is in a unique position to help solve your difficulties. Our "bar-stretchers" include suggestions for substitute grades — alternate methods of manufacture — varying your present methods of treatment — and many more!

A letter or phone call to your nearest Wheelock, Lovejoy warehouse will bring an experienced man to help you stretch your alloy steel supply.

And he will be delighted to be of service! *SCRAP is worth money, and every pound turned in means more steel for you — so get in the SCRAP!*

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

WHEELOCK, LOVEJOY & CO., INC.

Warehouse Service

CAMBRIDGE • CLEVELAND
CHICAGO • HILLSIDE, N. J.
DETROIT • BUFFALO
CINCINNATI

In Canada
SANDERSON-NEWBOULD, LTD., MONTREAL

HY-TEN and AISI

131 Sidney St., Cambridge 39, Mass. and Cleveland • Chicago • Detroit Hillside, N. J. • Buffalo • Cincinnati

largely resulting from the operation of existing facilities at near-capacity levels.

Warehouse . . .

Warehouse Prices, Page 141

Philadelphia—Most steel distributors report order volume this month well sustained. Some report they could sell much more bar tonnage, especially cold-drawn, and more plates were they available.

Pittsburgh—Receipts from mills are only average according to the majority of the district's warehousemen. Even though incoming shipments are better than six months ago, customer demand continues firm which keeps stocks low.

Cleveland—While the warehouses are able to augment their light, flat-rolled stocks much more easily than was the case in past months, overall stock position continues unbalanced. In some cases the distributors are turning away mill offers of cold-rolled sheets and strip. Bars, especially, cold-finished, however, continue scarce as is the case with heavy plates and structurals.

St. Louis—Overstocked condition of some steel warehouses is being reflected in isolated price cuts, principally on cold-rolled sheets by the smaller independents. Overall warehouse demand is receding.

Birmingham — Warehouse steel stocks, while still inadequate in terms of overall demand, are in better shape than during the last quarter.

Seattle — Warehouse stocks are somewhat improved. Distributors now expect noticeably larger inventories by third quarter. Cold-rolled sheets are in better supply but hot-rolled sheets continue tight.

Scrap . . .

Scrap Prices, Page 142

Pittsburgh—While better movement in open hearth grades is noted, the situation is still far from good. Mills are inspecting incoming material more rigidly and less upgrading by dealers is reported. Alloy is firm in price but demand has softened. One leading automotive manufacturer has been offering for sale here, 45,000 tons of sheets which have been rolled on different conversion mills in the area.

Boston—Slightly heavier movement of steel scrap to yards was temporarily set back by the worst weather of the winter last week. For several days operations all but halted with resulting delay in shipments. Consumers were compelled to draw heavier on their limited inventories. Requested allocations for special or premium grades for open hearths, in one case, were not met for the reason the tonnage is not in sight. For unprepared scrap $26.17 for heavy melting steel is being paid with higher prices rumored. Cast grades are slow. Some tonnage is moving under ceiling prices.

New York—Consumers of open hearth scrap are gradually catching up on the emergency. Less tonnage is being allocated and there are fewer requests from the mills for allotments. Also, upgrading is being eliminated as result of the easier trend. Foundries are specifying lightly for cast grades, resulting in some cutting of trucking charges as a competitive measure. For instance, where $4 might be legitimately asked for trucking, no more than $2.50 now is being charged in some cases.

Buffalo—New scrap allocation orders are expected shortly to care for the requirements of a leading mill here which is low on inventory. Generally, however, the scrap supply situation is improved. A fair tonnage is now moving here which is not subject to allocations. Some of the top buyers are out of the cast iron market. Prices on the latter continue to hold at ceiling here, but sales are reported in the eastern part of the state below ceiling.

Philadelphia — Most open hearth scrap is still moving under allocation but few new requests for directive tonnage are being made. This is seen as indicative of slightly freer movement of material. The mills are able to obtain more charging box cast scrap at $47 and breakable at $45 to round out requirements. Demand for unstripped motor blocks has dropped sharply.

Detroit—Need for scrap remains steady and all interests regard continuation of the scrap drive essential. Latest report from Chrysler Corp. shows in excess of 3000 tons were shipped from parts depots and dealers in January.

Cleveland—Movement of industrial scrap through some dealers' yards in this district is the slowest since end of World War II. A pickup next month is expected on the basis of a possible spurt in placement of defense work. Considerable regrading has been going on recently as a result of thorough inspection of shipments by OPS field men. Market is steady on heavy melting and turnings. Demand is stronger for electric furnace grades.

Chicago—Steelmaking scrap supply continues nip-and-tuck with moderate weather exerting a favorable influence to maximum dealer yard preparation and shipments. No furnaces are now withheld from production for lack of melting material. For the first time since a new open hearth was completed in November, Keystone Steel & Wire Co., Peoria, is able to operate all its four units simultaneously, but it is doing this with only 5½ days scrap inventory. Demand for blast furnace grades is spasmodic and supply adequate. Cast scrap, principally auto blocks, is in over-abundance. This is leading to a confused situation as to whether price shading is going on or the material is being reclassified. Celing on No. 1 machinery is $52 but it has gone into charging box orders at $47.

St. Louis—The paradox of scarce steel scrap and cast almost unsaleable at any price continues. Melting steel supplies have improved a trifle the last couple of weeks, but less because of better shipments than because consumer goods restrictions have trimmed production needs.

Birmingham — Moderate tonnages of heavy melting steel are available in this district from time to time. That is, what dealers call free steel. Cast grades are considerably more plentiful and No. 1 cast, heretofore $49 a ton f.o.b. yards, is reported this week at $44 delivered. Stove plate also has taken a tumble, dropping from $46 f.o.b. yards to $41 delivered.

San Francisco — Cast iron scrap prices have dropped sharply here, reflecting a decrease in foundry demand and larger collections. Delivered prices for metropolitan scrap have been cut around $5 per ton. Markdown on out-of-town material ranges up to $15 per ton, depending upon the amount of freight absorbed.

Seattle—Increasing supplies of cast iron scrap, attributed in part to the speed-up in automobile dismantling, have beared the market, sales being reported at $33 per ton, $12 under the government ceiling.

MATHEWS
CONVEYERS
Since 1905. Engineers and manufacturers of Conveyers and Conveyer Systems for the Metal-working Industries.
Three modern plants. Engineering Offices in All Principle Cities. There's an Engineering Sales Office near you.
MATHEWS CONVEYER CO.
ELLWOOD CITY . PENNSYLVANIA
SAN CARLOS . . CALIFORNIA
PORT HOPE . ONTARIO, CANADA

STEEL Tubing
PROMPT DELIVERY FROM STOCK
Mechanical Tubing ¼" to 14" O.D. • Seamless Pipe to 24" O.D. • Boiler & Pressure Tubes — Seamless or Welded from ⅛" • Stainless Steel Pipe, Tubing & Fittings • Tube Fabrication, Bending, Swaging, Upsetting, etc.
A B MURRAY CO INC
606 Green La. Elizabeth, N.J. EL-2-8182
Box 405-H McKeesport, Pa. McKPT 4-9107

CHEMSTEEL CONSTRUCTION COMPANY, INC.
203 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.
(No "tie-in" with any manufacturer)
Send data on your Design, Engineering & Construction Facilities for erection of
ACID-ALKALI-PROOF TANKS & FLOORING
NAME.....
COMPANY.....
ADDRESS.....
CITY.....ZONE..STATE....

Rails, Cars . . .

Track Material Prices, Page 137

Birmingham—St. Louis-San Francisco railway has placed an order with the Bessemer plant of Pullman-Standard Car Co. for 500 hopper cars for delivery next year. This brings to 900 cars on order here for the Frisco.

Canada . . .

Toronto, Ont.—Production of iron and steel in Canada made a new high record in 1951. Production of steel ingots and castings totaled 3,567,361 net tons, gain of 183,230 tons over the 1950 total of 3,384,131 tons.

For the year production was 90.6 per cent of rated capacity against 85.1 per cent in 1950. Output included 3,446,125 tons of steel ingots and 121,236 tons of steel castings.

Pig iron production for 1951 totaled 2,552,650 net tons against 2,309,732 tons in 1950.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7700 tons, army warehouses, Schenectady, N. Y., area, to Harris Structural Steel Co., New York, through Ring Construction Co., Minneapolis.

3000 tons, boiler house, American Gas & Electric Service Corp., Lawrenceburg, Ind., to American Bridge Co., Pittsburgh.

2500 tons, estimated, main factory building and facilities, Bureau of Yards and Docks, Navy, Bristol, Tenn., to Bristol Iron & Steel Works, Bristol, Tenn.

2300 tons, power house, Connecticut Light & Power Co., Montville, Conn., to Bethlehem Steel Co., through United Engineers & Constructors Inc., Philadelphia.

475 tons, diesel repair shop, Pennsylvania Railroad, Pitcairn, Pa., to Pittsburgh Bridge & Iron Works, Pittsburgh.

400 tons, power station, New Orleans Power Co., New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh.

350 tons, power house, Arizona Light & Power Co., Phoenix, Ariz., to Allison Steel Mfg. Co., that city.

300 tons, estimated, spillway tainter gates, hoists, etc., Big Cliff power project, Oregon; general contract by U. S. Engineer, Portland, to Gunderson Bros. Engineering Corp., Portland.

275 tons, Army warehouses, Governors Island, New York, to Simon Holland & Son Inc., Brooklyn, N. Y.

STRUCTURAL STEEL PENDING

14,500 tons, New York Central bridge, Harlem river, New York; American Bridge Co., Pittsburgh, low bidder.

12,000 tons, Boston connection, John F. Fitzgerald Expressway, Boston; to be awarded in three contracts, about 4000 tons each, Mar. 18, Mar. 25 and Apr. 1, Massachusetts Department of Public Works, Boston.

5970 tons, Hackensack river bridge between Jersey City and Kearney, Hudson county, New Jersey; bids through State Highway Department, Apr. 1; also 344 tons, miscellaneous steel, including 180 tons for sheaves, shafts and bearings, 82 tons of wire rope and 73 tons of cast steel.

8500 tons, double cantilever maintenance hangars, Limestone, Me.; Portsmouth, N. H., and Chicopee Falls, Mass.; bids to Corps of Engineers, Boston.

3000 tons, Boeing Airplane Co. hangar, Seattle; bids in, American Bridge Co., apparently low.

2600 tons, platform extension, Broad street station building, Pennsylvania Railroad, Philadelphia; Belmont Iron Works, Eddystone, Pa., low bidder.

1423 tons, state bridge, Dauphin county, Pennsylvania; bids Mar. 14.

1000 tons, furnace building, Kimbler Glass Division, Owens-Illinois Glass Co., Vineland, N. J.; bids Mar. 10.

Rolls

RED-CIRCLE Rolls for all purposes

- CHILLED ROLLS
- ALLOY IRON ROLLS
- MOLY ROLLS
- NICKEL CHILLED ROLLS
- GRAIN ROLLS
- COLD ROLLS
- SAND ROLLS

Hyde Park Red Circle rolls are outstanding in quality and in performance, and are easily identified by the Red Circle.

For finer finish—long life and greater tonnage, specify Red Circle.

Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.

ROLLS • ROLLING MILL MACHINERY • GREY IRON CASTINGS

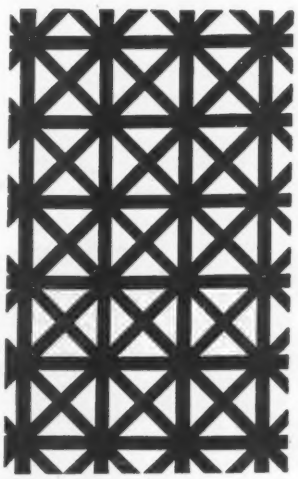
RED CIRCLE Rolls ALLOY-CHILLED

Hendrick Ornametal

TRADE MARK

This is a lightweight type of grille especially suited for radiator enclosures, stove panels, kitchen cabinets, clothes and broom closets, lockers, and similar applications. It is made of a special bright finish, cold rolled steel, suitable for painting or plating, and is available in a wide range of stock size sheets and gauges.

Hendrick Ornametal can be furnished in a variety of attractive designs, the one illustrated being "Smalcane." Write for full information.



SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

30 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

1000 tons, extension unit 3 Hudson plant, Rockland Light & Power Co., Thompkins Grove, N. Y.; bids closed Feb. 19.
635 tons, widening of state bridges, Bergen county, New Jersey; bids Mar. 11.
500 tons, state bridge, Secaucus, N. J.; Franklin Contracting Co., Newark, N. J., low on general contract.
400 tons, two railroad bridges, anchors, etc., McNary dam project; bids to U. S. Engineer, Walla Walla, Wash., Mar. 20.
300 tons, Washington state highway bridge, Cowlitz county; bids to Olympia, Feb. 26.
250 tons, municipal water filtration plant, Trenton, N. J.; bids Feb. 28.
200 tons, motor pool shop, Fort Lewis, Wash.; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2500 tons, units 1 and 2, Public Service Co. of Northern Illinois, to United States Steel Supply Division, U. S. Steel Co., Chicago.
1600 tons, Rossford Ordnance Depot, Rossford, O., to United States Steel Supply Division, Chicago.
450 tons, Harms road intercepting sewer, extension 2, Northbrook, Ill., to United States Steel Supply Division, Chicago.
380 tons, shop and technical building, Board of Education, Milwaukee, to United States Steel Supply Division, Chicago.
350 tons, expansion, Detroit Steel Corp., Portsmouth, O., to United States Steel Co., Chicago.
240 tons, expansion, Diamond Alkali Co., Painesville, O., to United States Steel Co., Chicago.
220 tons, general supply warehouse, Erie Ordnance Depot, LeCarne, O., to United States Steel Co., Chicago.
150 tons, St. Thomas Hospital, Akron, to United States Steel Supply Division, Chicago.

REINFORCING BARS PENDING

3700 tons, spillway, Stage 2, Randall dam, Lake Andes, S. Dak., for U. S. Engineer.
900 tons, Germantown reservoir, Dayton, O.
724 tons, Life Science building, Indiana University, Bloomington, Ind.
670 tons, expansion, Armco Steel Corp., Ashland, Ky.
600 tons, Board of Water and Electric Light, Lansing, Mich.
370 tons, housing project, Oakwood-Lake Park avenue, Chicago.
300 tons, Hackensack river bridge between Jersey City and Kearney, Hudson county, New Jersey; bids through State Highway Department, Apr. 1.
300 tons, reconstruction, Perry blast furnace, Interlake Iron Corp., Erie, Pa.
300 tons, ore yard extension and furnace foundation, Cleveland.
295 tons, river piers, Toledo expressway system, Lucas county, Ohio.
275 tons, state bridge, Dauphin county, Pennsylvania; bids Mar. 14.
250 tons, General Hospital, Goshen, Ind.
245 tons, substructure, N. Halsted street bridge, Chicago.
235 tons, high school, Riverside-Brookfield township, Riverside, Ill.
220 tons, highway bridge, South Sanish, N. Dak.
207 tons, St. Anthony hospital, Terre Haute, Ind.
206 tons, Airmen's dormitory, Youngstown, O., for Corps of Engineers.
200 tons, Washington state highway projects, Benton and Cowlitz counties; bids to Olympia, Feb. 26.
200 tons, widening of state bridges, Bergen county, New Jersey; bids Mar. 11.
176 tons, Lockbourn Air Base, Columbus, O.
165 tons, substructure, bridge, Lowell, Mass.; bids in.
160 tons, Community General hospital, Sterling, Ill.
140 tons, forge shop pilot line, Lockland, O.
115 tons, Washington state overcrossing, Chelan county; bids to Olympia, Feb. 19.
100 tons, including mesh, tire storage warehouse, Rainier Ordnance depot, Washington state; general contract to John H. Sellen Const. Co., Seattle.
100 tons, Washington state highway project, Mason county; general contract to David Nygren, Seattle.
100 tons, Pittsburgh Joint Stockyards, Pittsburgh.
100 tons, St. Leo high school, Chicago.

PLATES . . .

PLATES PLACED

560 tons, two tanks, Shell Oil Co., Wood River, Ill., to Bethlehem Steel Co.
100 tons, estimated, nonmagnetic steel float for U. S. Navy, to National Steel Construction Co., Seattle.

PLATES PENDING

300 tons, including shapes, (estimated) two tugs and two steel barges for Alaska Railroad; bids in to General Service Administration, Seattle.
Unstated, 1200 lineal feet steel piling; bids to U. S. Engineer, Walla Walla, Wash., Mar. 20.

PIPE . . .

CAST IRON PIPE PENDING

Unstated, 1200 feet, 12 inch cast iron water pipe, also alternatives; bids to Alaska Public Works, Juneau, Alaska, Mar. 26; for Kodiak water system.

STEEL PIPE PENDING

Unstated, 2650 feet, 4 inch steel pipe and fittings; bids to Colville, Wash., Feb. 19.

RAILS, CARS . . .

RAILROAD CARS PLACED

Carbon County Railway, 200 seventy-ton triple hopper cars, to Greenville Steel Car Co., Greenville, Pa. This railway serves the plant of Geneva Steel Division, United States Steel Co.
Chesapeake & Ohio, 1000 seventy-ton hopper cars, to American Car & Foundry Co., New York.

BIGGEST VALUE IN TOOL and CUTTER GRINDERS TODAY!

MODEL B800

Will Do Anything That Machines Costing 2 or 3 Times More Will Do

Distributed Only Through Franchise Dealers

See Your Authorized "K-O" Distributor Or Write For Descriptive Literature

K. O. LEE CO.
ABERDEEN, S. D.

Each link of pickling chain carries its own HEAVY BURDEN

so you owe it to yourself, your employees and your customers to use only the SAFEST CHAIN POSSIBLE in your pickling department. We make BRONZE DIE-CAST CHAINS of "ALBRO" METAL. Our links are acid-resisting and exceptionally strong. Because the links are not eaten by the acid, "ALBRO" METAL chains remain in constant use for seven and eight years.

WE REPAIR ALL TYPES OF CHAINS

No matter what kind of a chain you're now using, we are well equipped to repair it for you. We can cast the new link in your chain in a hurry. When the chain is put in use again, you can see for yourself the superior qualities of "ALBRO" METAL.

BRONZE DIE CASTING CO.
FRANKLIN ST. AT OHIO RIVER, PITTSBURGH, PA.
"ALBRO" METAL

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Operations Are Consolidated

Michigan Limestone Division, U. S. Steel Co., will close its offices at New Castle, Pa., about Apr. 1 and will consolidate its operations at other offices. Irvin L. Clymer, division president, says this is part of the parent company's program of consolidating operations throughout the organization.

Sand Handling Improved

Elyria Foundry Division, Industrial Brownhoist Corp., Elyria, O. is equipping its heavy molding departments with a new sand handling system. All used sand will be removed to a central storage from which it will be reconditioned and distributed by belt conveyors to the various molding stations and core making departments. Cost of the improvement is estimated at $400,000.

Bath To Build Branch Plant

Cyril Bath Machinery Co., Cleveland, plans to build a manufacturing plant in Solon, O. This branch plant will specialize in defense production of the recently announced rotary draw former which consists of a huge rotating table and three hydraulic rams. It is capable of molding the toughest new metal alloys needed for jet engines.

Forms New Research Division

American Zinc, Lead & Smelting Co., St. Louis, completed a research laboratory at 10334 Manchester Rd., Kirkwood, Mo. The new laboratory will be devoted exclusively to new products development, supplementing the company's present research program. Dr. H. A. Depew is director of the St. Louis Research Division.

Greenwich Buys Plow Works

Greenwich Mfg. Inc. purchased the Eddy Plow Works, Greenwich, N. Y., and plans to expand. The new corporation is headed by Wilbur C. Rice. The plant will be used for foundry and machine shop work and continued manufacture of plows and other farm equipment.

Rockwell Buys Tool Firms

Rockwell Mfg. Co., Pittsburgh, acquired Deluxe Saw & Tool Co. and Karbide King Tool Corp. which operate plants in Chicago and High Point, N. C. Deluxe pioneered the manufacture of tungsten carbide tipped circular saws for industrial application. The Chicago plant will be under the supervision of A. G. Feldman while Claud T. Miller will manage the High Point plant.

Acquires Brush Development

Cleveland Graphite Bronze Co. acquired ownership of Brush Development Co., both of Cleveland. Brush is a research and manufacturing organization widely known in the fields of electronics and technical instruments.

Castalloy Increases Output

Castalloy Co., Cambridge, Mass., is expanding production of magnesium and aluminum castings, having established foundry operations at its new plant on W. Central St., Natick, Mass. The plant has a monthly capacity of 60,000 pounds of finished castings.

Babcock & Wilcox Expands

Babcock & Wilcox Co., New York, started construction on a new plant in Paris, Tex. This is the third new plant to be announced by the company within a year. It will manufacture components for large utility and industrial boilers and will assemble smaller FM boilers.

Fansteel Forms Division

Production, engineering and sales of selenium rectifiers and tantalum electrolytic capacitors were integrated into Rectifier-Capacitor Division, Fansteel Metallurgical Corp., North Chicago, Ill. Glen Ramsey is general manager and O. S. Aikman is sales manager of the division.

Chicago Firm Leases Plant

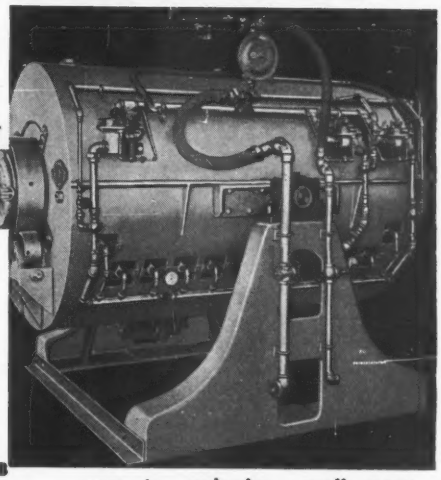
Webster - Chicago Corp., Chicago, leased a plant at Talman and Ogden avenues, that city, to expand production facilities. This is the third Chicago factory for this producer of phonographs, record-changers and magnetic recorders.

Refractories Maker Expands

An extensive plant expansion and improvement program, designed to increase output of refractories products, is announced by W. E. Robinson, president, Robinson Clay Product Co., Akron. An important phase of the program is the addition of modern pressing, drying and firing equipment at the company's fire-clay brick plants. At Robinson's silica brick plant, new press-

BEYOND any QUESTION

The CHEAPEST and MOST RELIABLE way to carburize small parts. Specify the AGF No. 4 Rotary Gas Carburizer.

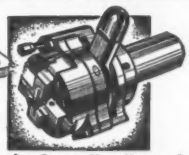


Write for bulletin No. 1212

AMERICAN GAS FURNACE CO.
996 LAFAYETTE STREET, ELIZABETH 4, N. J.

H&G Insert Chaser DIE HEADS

famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.



THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: A. C. Berbringer, 334 N. San Pedro St., Los Angeles, California. Canada: F. F. Barber Machinery Co., Toronto, Canada.

To Lower your Overhead..

BROWNING ELECTRIC TRAVELING CRANES AND HOISTS up to 125-TON CAPACITY

VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

FRONT LEVER BENCH PUNCH

This versatile hand operated punch has a capacity of 7/16" hole through ¼" steel or equal and weighs 70 pounds.

65 sizes of punches and dies—round, square, flat, and oval—to fit this punch are carried in stock for immediate shipment.

SEND FOR CATALOG SHEETS

Manufacturers of metal-working tools for 64 years.

T. H. Lewthwaite Machine Co., Inc.
310 East 47th Street New York 17, N. Y.

GET RID OF UNWANTED HEAT FASTER, AT LESS COST WITH . . .

Republic Rubber ASBESTOS COVERED Cooling Hose

● Cold water, delivered through Republic Rubber Asbestos Covered Furnace Door Cooling Hose, works more efficiently to carry off unwanted heat!

Exterior is wire-reinforced against mechanical abuse. Two plies of braided asbestos insulate the hose and keep the heat away from the coolant until it reaches the place where it will do the most good.

Republic's Asbestos Covered Cooling Hose lasts longer and costs less to use. Its flexibility makes it easy to connect . . . makes it ideal for installation on moving parts.

Republic Asbestos Covered Cooling Hose is supplied in all standard sizes and lengths.

Contact your local Republic Distributor or write direct for full facts.

Photo courtesy United States Steel Company Pittsburgh, Pennsylvania

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

WALLS WILL NOT A PRISON MAKE: . . . This steel truss will form part of the framework for the finishing department of the seamless tube mill Republic Steel Corp. is building in South Chicago. It will be finished this year

NOR IRON BARS A CAGE: A workman ties reinforcing rods with wire at the new Republic Steel seamless tube mill at South Chicago. The mill will produce more than 150,000 tons of seamless tubular products per year

ing and forming equipment has been added. Improved material handling methods and equipment is another important phase of the program.

Die Casting Plant Opened

Precision Castings Corp., a wholly-owned subsidiary of Precision Castings Co. Inc., Syracuse, N. Y., opened a die casting plant in Chicago. It is equipped for production of aluminum, magnesium and zinc-base alloy die castings, as well as for the building of die casting dies, tools, jigs and fixtures. Theodore H. Pickering is works manager of this plant.

Machinery Firm May Expand

American Machine & Foundry Co. may expand its plant in Cheektowaga, N. Y. The expansion program depends on the extent of future orders received by the plant.

Sprague Establishes Branch

Sprague Electric Co., North Adams, Mass., established an application engineering office and radio noise suppression laboratory at 11325 Washington Blvd., Culver City, Calif. Thomas S. Bills is manager of the office. The company makes condensers and radio interference filters.

Luscombe Project Started

Work is underway on the first three units of the $450,000 plant expansion program recently announced for Luscombe Airplane Corp., Dallas. These units are the north and south extensions of the main factory building and an extension of the process building. The plant is turning out elevators, rudders, and doors and hatches for the Convair bomber.

Douglas Leases Property

Douglas Aircraft Co. Inc., Santa Monica, Calif., leased 200 acres of land and various buildings at 190 Street and Normandie avenue, Los Angeles, from the Columbia-Geneva Steel Division, U. S. Steel Co. The property housed an aluminum plant during World War II.

Latrobe Opens Branch Office

Latrobe Electric Steel Co., Latrobe, Pa., opened a branch office at 5475 Delmar Blvd., St. Louis, under the direction of Mr. Sundstrom. The company produces high-speed steels and high-carbon high-chromum die steels.

Utility Gets Option on Site

Pacific Gas & Electric Co, northern California utility, has an option on a 30-acre tract in the Decoto-Niles area for establishment of a pipe processing yard. The site is near the Pacific States Steel Corp.

U. S. Plastic Co. Expands

U. S. Plastic Co., Pasadena, Calif., is constructing additional facilities for manufacture of plastic toys and housewares. Completion is scheduled by February.

Ford Enlarges Coast Plant

Ford Motor Co., Dearborn, Mich., plans an expansion of its Richmond, Calif., assembly plant to boost capacity about 35 per cent.

The Richmond plant now is operating at only about two thirds of capacity, due

Time saved is Money Earned!
Get the facts about the patented
Self-fitting
HICKORY
HANDLES
Write
HARTWELL
BROTHERS
MEMPHIS 8, TENN.
CHICAGO HEIGHTS, ILL.
No Fitting
No Splitting

OHIO LOCOMOTIVE CRANES
25 TO 40 TON CAPACITY
GASOLINE • DIESEL
ELECTRIC • STEAM
THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

We offer our facilities for:
★ Electro Lead Plating
★ Electro Tin Plating
★ Hot Oil Fusing
and
★ Hot Tinning
Parts of steel, brass, and copper for protection against corrosion.
STEEL PROTECTION & CHEMICAL COMPANY, INC.
Dept. S, Mooresville, Indiana

The Cleveland Steel Tool Co.
• PUNCHES • DIES • CHISELS • RIVET SETS •
IF IT'S RIVETED YOU KNOW IT'S SAFE
WE FEATURE SPECIAL PUNCHES & DIES
660 E. 82nd ST., CLEVELAND, O.

COPPER—BRASS—BRONZE
PERFORATED
TO YOUR REQUIREMENTS
PERFORATED METALS
FOR ALL INDUSTRIAL USES
SEND FOR CATALOG No. 35
ARCHITECTURAL GRILLES
DIAMOND MFG. CO.
BOX 32 WYOMING, PA.

55 PAGES OF FACTS ON HOW TO CUT YOUR SMALL PARTS FINISHING COSTS

Now you can get up-to-the-minute news on the very latest developments in barrel-finishing — the fast, modern, economical process that deburrs, removes scale, tool marks and flash, and produces surface finishes and radii to blueprint specifications.

Norton Company's brand new booklet covers the subject thoroughly in 55 liberally illustrated, fact-filled pages — describes in detail every phase of barrel-finishing — tells you what to do, *and what not to do,* for best results.

PARTIAL LIST OF SUBJECTS

TYPES OF EQUIPMENT . . . CLEANERS . . . ROUGHING . . . RUST PREVENTIVES . . . FINISHING . . . PROCESSING OF SAMPLES . . . SEPARATION OF WORK FROM ABRASIVE . . . WASHING . . . DRYING . . . RESCREENING OF ABRASIVE . . . MIXING DIFFERENT PARTS.

GET THIS MONEY-SAVING INFORMATION

The new booklet also tells you how Norton ALUNDUM* tumbling abrasive — especially developed to meet industry's wartime needs for fast, efficient small parts finishing — has become a standard barrel-finishing medium in plants throughout the country.

Learn how this tough, hard abrasive helps you to shorten tumbling cycles, reduce scrap and reworking, and gives you consistently better finishing of parts ranging in size from tiny rivets to larger castings. Ask your Norton distributor or representative for your free copy of "Barrel-Finishing With ALUNDUM Tumbling Abrasive," or write us direct.

NORTON COMPANY, WORCESTER 6, MASS.

Distributors In All Principal Cities

EXPORT: NORTON BEHR-MANNING OVERSEAS INC.
Worcester, Mass. New Rochelle, N. Y.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES
Making better products to make other products better

to general automobile curtailment.

Ampco Appoints Distributor

Ampco Metal Inc., Milwaukee, appointed Upton, Bradeen & James Ltd., Toronto, Ont., as exclusive distributor of its resistance welding tips, dies, holders, rods, bushings, wheels, etc., in Canada.

Pittsburgh Branch Moved

Pratt & Whitney Division, Niles - Bement - Pond Co., West Hartford, Conn., moved its Pittsburgh office to 683 Lincoln Ave., that city. W. W. Stoner Jr. is district manager.

To Build Conveyor Equipment

Flexoid Conveyor Co., recently formed division of Smith Power Transmission Co., Cleveland, installed punch presses, shears, brakes and electrical and arc welding equipment to produce mechanical conveyor applications for the handling of a wide variety of materials. Flexoid will develop, design, construct and install conveyor equipment for diversified industries. Stiles C. Smith III is president of both companies.

Blade Mfg. Enlarges Plant

Blade Mfg. Co., Columbus, O., is expanding its facilities. A plant addition, containing 2400 square feet, will house a new heat-treating installation for the firm's line of wood and metal cutting circular saw blades. Charles F. Callahan is president.

Hirschmann Opens Branch

Carl Hirschmann Co., Manhasset, N. Y., opened a branch at 525 E. Michigan St., Milwaukee. Russell T. Gilman is executive director of this branch while C. J. Sterenberg is manager of sales and service. This firm represents more than 25 Swiss machine tool producers.

Klopp-Werke Shapers Offered

Europe's largest manufacturer of shaping machines, Klopp-Werke, appointed Kurt Orban Co. Inc., New York, as sole distributor in the United States for its line of high-speed shapers.

Gulf To Build Two Plants

Contracts for a sulphuric acid plant and a polymerization plant, to be erected at the Port Arthur, Tex., refinery of Gulf Oil Corp., Pittsburgh, were awarded. Construction is expected to begin on both plants in about three months.

Challenge Mfg. Moves Office

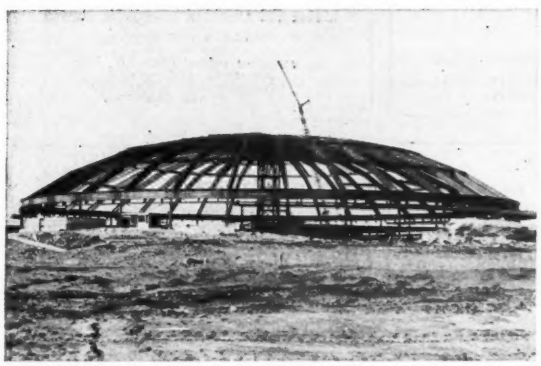
Challenge Mfg. Co. moved its general offices and purchasing department to its main plant at 7400 E. Bandini Blvd., Los Angeles 22.

Chemical Firm Names Agent

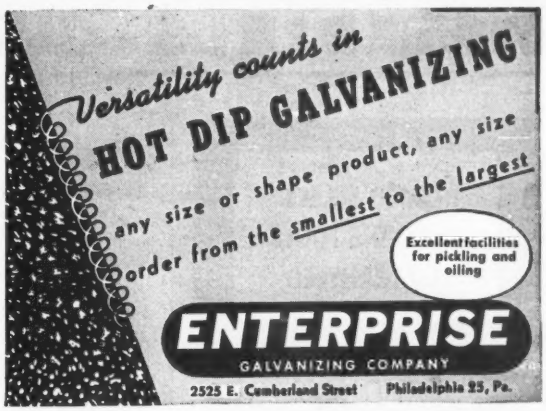
Northwest Chemical Co., Detroit, appointed Alert Supply Co., Los Angeles, as its western representative.

Incorporation Papers Filed

Charters of incorporation were filed with the secretary of state's office, Dover, Del., by Ambrican Inc., tools, with United States Corporation Co., Dover, acting as the principal office; Rex Salvage Corp., iron and steel, with Registrar & Transfer Co., Dover, serving as principal office; Tool Engineering Service Co., machinery, with Corporation Guarantee Trust Co., Wilmington, serving as the principal office; B. & M. Welding & Iron Works Inc. with Capital Trust Co., Dover, serving as the principal office.



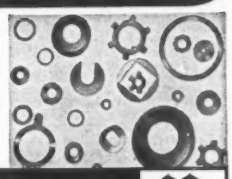
OVERAWING DOME: More than 400 tons of structural steel were used to construct this 225-foot diameter all-steel shallow-type dome at the newly completed Jordan Marsh store near Boston. It is formed by 36 arc welded ribs, each 110 feet long. The welding job used over 4 tons of General Electric electrodes. Base is supported by 36-inch deep ring girders weighing 300 pounds a foot


Versatility counts in
HOT DIP GALVANIZING
any size or shape product, any size
order from the smallest to the largest
Excellent facilities for pickling and oiling
ENTERPRISE
GALVANIZING COMPANY
2525 E. Cumberland Street
Philadelphia 25, Pa.

THE BELMONT IRON WORKS
STRUCTURAL STEEL—BUILDINGS & BRIDGES
RIVETED—ARC WELDED
Cable Address—Belliron
Engineers—Fabricators—Erectors—Contractors—Exporters
Shops—Philadelphia—Eddystone—Royersford
Main Office: Phila. 46, Pa.
New York Office—44 Whitehall St., N. Y. 4, N. Y.

"WHITEHEAD WILL HAVE DIES FOR THESE WASHERS"

Washers are "big business" with Whitehead. Production is fast, economical. Big runs from automatic presses. U. S. Air Corps Standard washers, U. S. and S.A.E. Standards, etc. WRITE FOR CATALOG.



WHITEHEAD STAMPING CO.
1667 W. Lafayette • Detroit 16, Mich.
EST. 1903

HIGH SILICON IRON.
JISCO
SILVERY PIG IRON
A Blast Furnace Product made from only Virgin Ores
THE JACKSON IRON & STEEL CO. • JACKSON, OHIO

INTRODUCTION TO THE STUDY OF HEAT TREATMENT OF METALLURGICAL PRODUCTS
By Albert Portevin

Fundamental knowledge and essential principles of heat treatment of steel are presented in simple and understandable manner. Research engineers, metallurgical students and steel plant metallurgists engaged in metallurgical investigations and the heat treatment of ferrous and non-ferrous metals will find this book of inestimable value.

246 pages
69 illustrations
4 tables
Price $5.00 Postpaid

THE PENTON PUBLISHING CO.
Book Department, 1213 W. 3rd St., Cleveland 13, O.

MATERIALS--USED EQUIPMENT

CIMCO SELECT MACHINE TOOLS GUARANTEED

Defiance #3, Upright Drill, #5MT.
Pond 10' Vertical Boring Mill, 2 rail heads.
Colburn 54" Vert. Boring Mill, 2 heads.
King 42" Vertical Boring Mill, 2 heads.
Niles 42"-50" Driving Box Borer, Burnisher and Facer, late type.
LeBlond #2½ Univ. Miller, 3 SCD.
Hall Planetary Style D Miller.
U. S. Multi-Miller, Model MM-1-60, late type.
Gould & Eberhardt 96 H Hobber.
Gould & Eberhardt 18H Gear Hobber.
Brown & Sharpe #10 Tool & Cutter Grinder.
Heald #50 Internal Grinder.
Landis 10X18 Plain Grinder, late type.
Sellers 4T Tool Grinder, motor drive.
Sellers 6T Tool Grinder, late type.
Landis #2 Universal Grinder, cone drive.
Cincinnati 16 x 96 Plain Cylindrical Grinder.
Landis 16 x 72 Plain Cylindrical Grinder.
Brown & Sharpe #12 Plain Grinder, reversing mechanism.
Micro Internal Grinder, Model F.G.
Heald #70A Internal Grinder.
Heald #78 Centerless Internal & Cylindrical Grinder, late type, complete.
Landis #6 Precision Thread Grinder, New 1944.
Oliver Automatic Hydraulic Face Mill Grinder, new 1948.
Jones & Lamson 8 x 31 Thread Grinder.
Heald 72-A3 Plain Internal Grinder.
Reed Prentice 20" x 10' bed G.H., 78" centers, new 1941.
LeBlond 30" x 16' bed Cone Head Lathe, 9' centers, 3 SCD.
Lodge & Shipley 16" x 6' single pulley drive, 12 spindle speeds.
American 16" x 8', 3 SCD, 56" center distance, 1¼" hole in spindle.
Blount Model B-3 Special Application Lathe for Turning, 20" swing, 2½" hole in spindle, 54" centers.
Lodge & Shipley 20 x 8, single pulley drive, 12 spindle speeds.
Bradford 20" x 18', 4 SCD, 12' center distance, Loose change.
American 30" x 33' center distance, 2⅝" hole in spindle, first class.
American 48" x 10' centers, 2⅝" hole in spindle, first class.
LeBlond 21" x 10' bed, 3 SCD, 5'2" centers.
Gould & Eberhardt 16" Back Geared Shaper.
Gould & Eberhardt 24" Back Geared Shaper.
Gould & Eberhardt 28" Shaper, gear box.
Smith & Mills 32" Shaper, gear box.
Fellows 725 Gear Shaper with Spur Guide.
Fellows 612 Spur Gear Shaper.
Brown & Sharpe 3-26 Gear Cutter.
Brown & Sharpe 4-48 Gear Cutter.
Gould & Eberhardt 60 BM Gear Rougher.
Cincinnati 24 x 24 x 6' Double Housing.
Liberty 36 x 36 x 18 Double Housing Planer.

GUARANTEED MACHINERY

Cincinnati Machinery Company Incorporated
207 E SECOND STREET
CINCINNATI 2, OHIO

BLAST FURNACE FOR SALE

As usable, Blast Furnace Shell with four stoves, dustcatcher and gas piping.

Steel shells on concrete foundation.

Furnace Hearth dimension—18 feet.

Stoves, inside dimension — 22 feet.

Available for inspection. Good condition.

Location—Windsor, Ontario.

For further details write

The Canadian Bridge Company Ltd.,
Walkerville, Ontario.

WANTED

ROLLING MILL HOUSINGS

12" to 30" Between Frames With or Without Rolls & Bearings

STRAIGHTEN & CUTOFF MACHINE

Any Width 8" to 30" Strip

Hind Steel Co., Inc.
Union, N. J.

FOR SALE

3 15KVA Taylor-Hall Spot Welders

1 3-Stage Alodizing Machine—suitable for aluminum

1 25-HP Single Stage Pressure Blower

NASSAU TUBE CORPORATION
P. O. Box 235
Hicksville, New York

WANTED VERTICAL BORING MILL

Used Vertical Boring Mill, 14 to 16 ft. dia. Give full description.

STANDARD STEEL CORP.
5001 Boyle Ave., Los Angeles 58

STRIP STEEL

We offer, subject to prior sale
Hot Rolled Strip, Bessemer.
Rolled by prominent American Mill.

50 tons 3" x .109 x 10 feet

50 tons 3" x .099 x 12 feet

Location—Greater Boston.

Price—"Mill Basis" as per O.P.S. Regulations.

Hiram A. Lerner, Owner's Agent
44 Binney St., Cambridge, Mass.
Phone Kirkland 7-8907

FORGING & DIE SINKING EQUIPMENT

All Kinds We Buy—We Sell Contact Us First

WILKIE DIE PRODUCTS COMPANY

Specialists in Forging Equipment
186 Hawthorne Blvd. Grosse Pointe Woods 36, Mich.
Phone (Detroit) TUxedo 1-7149

HORIZONTAL BROACH

SINGLE END AMERICAN HORIZONTAL BROACH

12 Ton, 130" Stroke
New in 1943

WINSTON MACHINERY CO., INC.
326 WEST OHIO STREET
INDIANAPOLIS 2, INDIANA
PLAZA 2408

FOR SALE

1—Pair Wean Tables for Hot Sheet Mill.
1—156" x ¼" Sheet Squaring Shear.

FRANK B. FOSTER, INC.
2220 Oliver Building Pittsburgh 22, Pa
Cable Address "Foster Pittsburgh"

BORING MILLS, 24"-36"-42"-52"-66"-72".
BULLDOZERS, No. 25 and 27, W. and W.
HAMMER, NAZEL, 5-N, 6" x 6". M.D.
KEYSEATERS, Nos. 1, 2 and 5, BAKER.
LATHE, 42" x 30' PUTNAM, M.D.
SHAPER, 36" MORTON Draw Cut, M.D.
STRAIGHTENER, Shape No. 3 SUTTON.

WEST PENN MACHINERY COMPANY
1210 House Bldg Pittsburgh 22 Pa

STEEL CAN HELP YOU BUY OR SELL

Used or Surplus Machinery and Equipment. Send in your copy instructions for an advertisement in this column. Your ad will reach the important men in the metalworking and metal-producing industry. Write to STEEL, Penton Bldg., Cleveland.

MATERIALS--USED EQUIPMENT

RAILROAD EQUIPMENT—*FOR SALE*

STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 50-Ton
Cabooses, Eight Wheel, Cupola Type
Flats, 50-Ton, Steel Underframe, 40'0"
Gondolas, Composite or All Steel, 50-Ton and 70-Ton
Gondolas, All-Steel, 55-Ton, Solid Bottom
Hoppers, Covered, All-Steel, 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 8,000-Gallon, Class II
Tank, 3,000-Gallon, High Pressure

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

STANDARD GAUGE DUMP CARS

End Dump, 20-Yd., 50-Ton Drop Door
End Dump, 10-yd., 30-Ton, Lift Door
Side Dump 16-Yd., 30-Ton Lift Door

STANDARD GAUGE DIESEL LOCOMOTIVES

One Plymouth *Diesel-Mechanical*, 65-Ton, Type 0-6-0, Built 1940
One Davenport-Besler *Diesel-Electric*, 110-Ton Type 0-4-4-0, Built 1938
One 1500 H. P., 120-Ton, *Diesel-Electric*, Type 0-4-4-0

Send us your inquiries We Buy Freight Cars for Dismantling *Send us your offerings*

IRON & STEEL PRODUCTS, INC.

REPAIR PARTS For All Types of Freight Cars

General Office
13462 S. Brainard Ave.
Chicago 33, Illinois
Phone: BAyport 1-3456

New York Office
50-D. Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

STORAGE TANKS
6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

CLASSIFIED

Help Wanted

TOOL STEEL SALESMAN. A PROFESSIONAL tool steel salesman, not over 40, with a metallurgical background is wanted for a permanent career opportunity in the tool steel department of a full-line Philadelphia warehouse. Recent and continued sales experience with a mill or warehouse required. The opening represents further expansion by a leading distributor of the nation's finest tool steel line. Write stating education, steel experience, salary desired. Enclose non-returnable photograph. Reply W. H. Watt Advertising Agency, 225 S. 69th St., Upper Darby, Pa.

SALES ENGINEER—FOR SHEET METAL & Plate Fabricating Plant—must have at least five years' experience in welding procedure and steel plate fabrication and accustomed to selling large and small accounts. Prefer one who has been actively contacting concerns who are presently sub-contracting their work. Salary and commission—good opportunity. Metropolitan Welding Fabricators, Inc., Woodmont, Conn.

PICKLING FOREMAN. MAN WITH EXPERIence to take complete charge of pickling department in galvanizing plant in Phila. Give experience and salary desired in first letter. Write Box 452, STEEL, Penton Bldg., Cleveland 13, O.

Employment Service

SALARIED POSITIONS $5,000 TO $35,000. WE offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

Opportunities

PLATE FABRICATOR
DESIRES ADDITIONAL PRODUCTS

Will purchase outright or manufacture and sell same on royalty basis.

Write Box 459,
STEEL, Penton Bldg., Cleveland 13, O.

Positions Wanted

PLANT MANAGER: M.I.T. GRADUATE WITH 25 years' experience in Plant Management, including Production planning, machine and plant loading, Material and tool control, quality control, purchasing, incentives, standard costs, variable budgets, overhead analysis and break-even charts, job evaluation, supervisory responsibility chart and labor relations. Capable administrator with excellent record. Write Box 443, STEEL, Penton Bldg., Cleveland 13, O.

PURCHASING AGENT AVAILABLE. TEN years' experience in pneumatic tool industry. Familiar with material control, expediting, priorities and procurement of productive and non-productive materials. Will relocate. Write Box 458, STEEL, Penton Bldg., Cleveland 13, O.

Accounts Wanted

MANUFACTURERS AGENT COVERING THE state of Michigan with headquarters in Detroit, wants additional quality line on commission basis. Background of metallurgy and production. Write Box 460, STEEL, Penton Bldg., Cleveland 13, Ohio.

Contract Work

STAMPINGS
FIRST OPERATION BLANKS
TOOLS AND DIES

Our High Production Equipment
Means Lower Costs To You

SHENANGO INDUSTRIES, INC.
53 Federal Street Farrell, Pa.
Phone 25897

OPEN TIME
300 TON PRESS BRAKE
Will bend 20' x ¼" to 6' x ½" Pl.
ST. JOSEPH STRUCTURAL STEEL CO.
Box 68, Sta. "A" St. Joseph, Mo.

IF YOU HAVE CAPACITY OPEN,
why not line up sub-contract work through an advertisement in this section? For additional information or rates, write STEEL, Penton Bldg., Cleveland 13, O.

Bright-brazed and bright-hardened parts, courtesy Hamilton Standard Division, United Aircraft Corporation.

★ BRIGHT BRAZING

OF STAINLESS STEEL AND NON-FERROUS METALS WITH A

SARGEANT & WILBUR **CONVEYOR FURNACE**

Now, parts made of stainless can be BRIGHT-ANNEALED, BRIGHT-HARDENED or BRIGHT-BRAZED without oxidation, on a continuous production basis. They come from the controlled-atmosphere conveyor furnace scale-free, bright and clean.

No pickling, sand blasting or tumbling required. These costly operations are eliminated, so your parts retain their sharp design and edges. A special Sargeant & Wilbur alloy for bright-brazing makes the joint practically invisible because it resists dulling and matches the metal color perfectly. Steel and non-ferrous metal parts are brazed in the same operation with excellent results.

Your samples processed FREE. To see your products bright-brazed, send samples and specifications.

SARGEANT & WILBUR, INC.
180 WEEDEN STREET, PAWTUCKET, R. I.

Send for free illustrated booklet giving more information on the Sargeant & Wilbur Conveyor Furnace.

Name .....

Company .....

Address .....

REPRESENTATIVES

NEW YORK CITY and PENNSYLVANIA Gerald B. Duff, 68 Clinton Ave., Newark, N. J.; MICHIGAN and NORTHERN OHIO M. C. Schwer, 2970 W. Grand Blvd., Detroit 2, Mich.; NEW ENGLAND James J. Herkis, 184 Weeden St., Pawtucket, R. I.

Advertisers in this Issue

Alliance Machine Co., The 122
Aluminum Company of America 100, 101
American Gas Furnace Co. 155
American Hoist & Derrick Co. 92
American Roller Die Corporation 148
Armco Steel Corporation 42

Baker, J. E., Co., The 91
Barium Steel Corporation 1
Belmont Iron Works, The 159
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 144
Bixby, R. W., Inc. 161
Blaw-Knox Co., Pittsburgh Rolls Division 107
Bridgeport Brass Co., The 110, 111
Bronze Die Casting Co. 154
Browning, Victor R., & Co., Inc. 155
Bullard Co., The 60

Carpenter Steel Co., The 138
Century Electric Co. 98
Chain Belt Co. 31
Chambersburg Engineering Co. 116
Chemsteel Construction Co., Inc. 152
Cincinnati Machinery Company, Inc. 160
Cleveland Cap Screw Co., The 105
Cleveland Steel Tool Co., The 157
Cleveland Welding Co., The 131
Cleveland Worm & Gear Co., The ..... Inside Back Cover
Cone-Drive Gears Division, Michigan Tool Co. 9
Continental Foundry & Machine Co. 103
Copperweld Steel Co. 63
Crucible Steel Company of America 140
Cutler-Hammer, Inc. ..... Back Cover

Dayton Rubber Co. 21
Delco Products, Division of General Motors Corporation 36
Denison Engineering Co., The 7
Diamond Mfg. Co. 157
Du Pont, E. I., de Nemours & Co., Inc. 143

Eastern Machine Screw Corp., The 155
Eaton Manufacturing Co., Reliance Division 74
Electric Controller & Mfg. Co., The ..... Inside Front Cover
Elgin National Watch Co. 5
Enterprise Galvanizing Co. 159

Federal Products Corporation 118
Firestone Steel Products Co. 45
Follansbee Steel Corporation 128
Foster, Frank B., Inc. 160
Frasse, Peter A., & Co., Inc. 127

General American Transportation Corporation 71
General Electric Co. 32, 33
Giddings & Lewis Machine Tool Co. 22, 23
Globe Brick Co., The 106
Goodyear Tire & Rubber Co., Inc., The 4
Gorham Tool Co. 12
Gulf Oil Corporation 125
Gulf Refining Co. 125

Hartwell Brothers 157
Hendrick Manufacturing Co. 153
Houghton, E. F., & Co. 56
Hyde Park Foundry & Machine Co. 153
Hydropress, Inc. 25

Iron & Steel Products, Inc. 161

Jackson Iron & Steel Co., The 159

Kenilworth Steel Co., The 67
Kidde, Walter, & Co., Inc. 10
Kinnear Manufacturing Co., The 109

Laclede Arch Co., Division of Laclede Christy Co. 85
Landis Machine Co. 8
Landis Tool Co. 15
Lapointe Machine Tool Co., The 11
Lebanon Steel Foundry 124
Lee, K. O., Co. 154
Lee Rubber & Tire Corporation, Republic Rubber Division 156
Leeds & Northrup Co. 147
Lewthwaite, T. H., Machine Co., Inc. 155
Link-Belt Co. 24
Luria Brothers & Co., Inc. 132

McDanel Refractory Porcelain Co. 114
McKay Machine Co., The 55
McKee, Arthur G., & Co. 89

Macwhyte Co. 2
Marsam Corporation 149
Master Products Co., The 148
Mathews Conveyer Co. 152
Michigan Tool Co., Cone-Drive Gears Division 9
Milwaukee Foundry Equipment Division, SPO, Inc. 112, 113
Monarch Machine Tool Co., The 94, 95
Multi-Hydromatic Welding & Mfg. Co., The 97
Murray, A. B., Co., Inc. 152

National Metal Products Co. 150
National Steel Corporation 14
Niagara Machine & Tool Works 26, 27
Norton Co. 158

Ohio Knife Co., The 115
Ohio Locomotive Crane Co., The 157
Osborn Manufacturing Co., The 73
Ottawa Steel Products, Inc. 114

Pawtucket Manufacturing Co. 6
Pittsburgh Rolls Division of Blaw-Knox Co. 107
Pittsburgh Steel Co., Thomas Strip Division 119

Reliance Division, Eaton Manufacturing Co. 74
Republic Rubber Division, Lee Rubber & Tire Corporation 156
Republic Steel Corporation 104
Roebling's, John A., Sons Co. 30
Roto-Finish Co. 117
Rust-Oleum Corporation 87
Ryerson, Joseph T., & Son Inc. 46

St. Joseph Structural Steel Co. 161
Sargeant & Wilbur, Inc. 162
Shenango Industries, Inc. 161
Signode Steel Strapping Co. 120
Simonds Abrasive Co. 102
South Bend Lathe Works 121
SPO, Inc., Milwaukee Foundry Equipment Division 112, 113
Standard Oil Co. (Indiana) 28, 29
Standard Pressed Steel Co. 34, 35
Steel Protection & Chemical Co., Inc. 157
Sutton Engineering Co. 108

Texas Co., The 38
Thomas Strip Division, Pittsburgh Steel Co. 119
Timken Roller Bearing Co., The, Steel & Tube Division 64
Tinnerman Products, Inc. 68
Tube Making Machines Ltd. 99

United Engineering & Foundry Co. 37
U. S. Stoneware Co. 126

Warner & Swasey 13
Wean Engineering Co., Inc., The 17, 20
Wean Equipment Corporation 18, 19
Weirton Steel Co. 14
Westinghouse Electric Corporation 41
West Penn Machinery Company 160
Wheelock, Lovejoy & Co., Inc. 151
Whitehead Stamping Co. 159
Wilkie Die Products Company 160

Youngstown Sheet & Tube Co., The 16

Table of Contents Page 5

Classified Advertising Pages 160, 161